

FIGURE 1 - General Overview of Distributed File Storage System

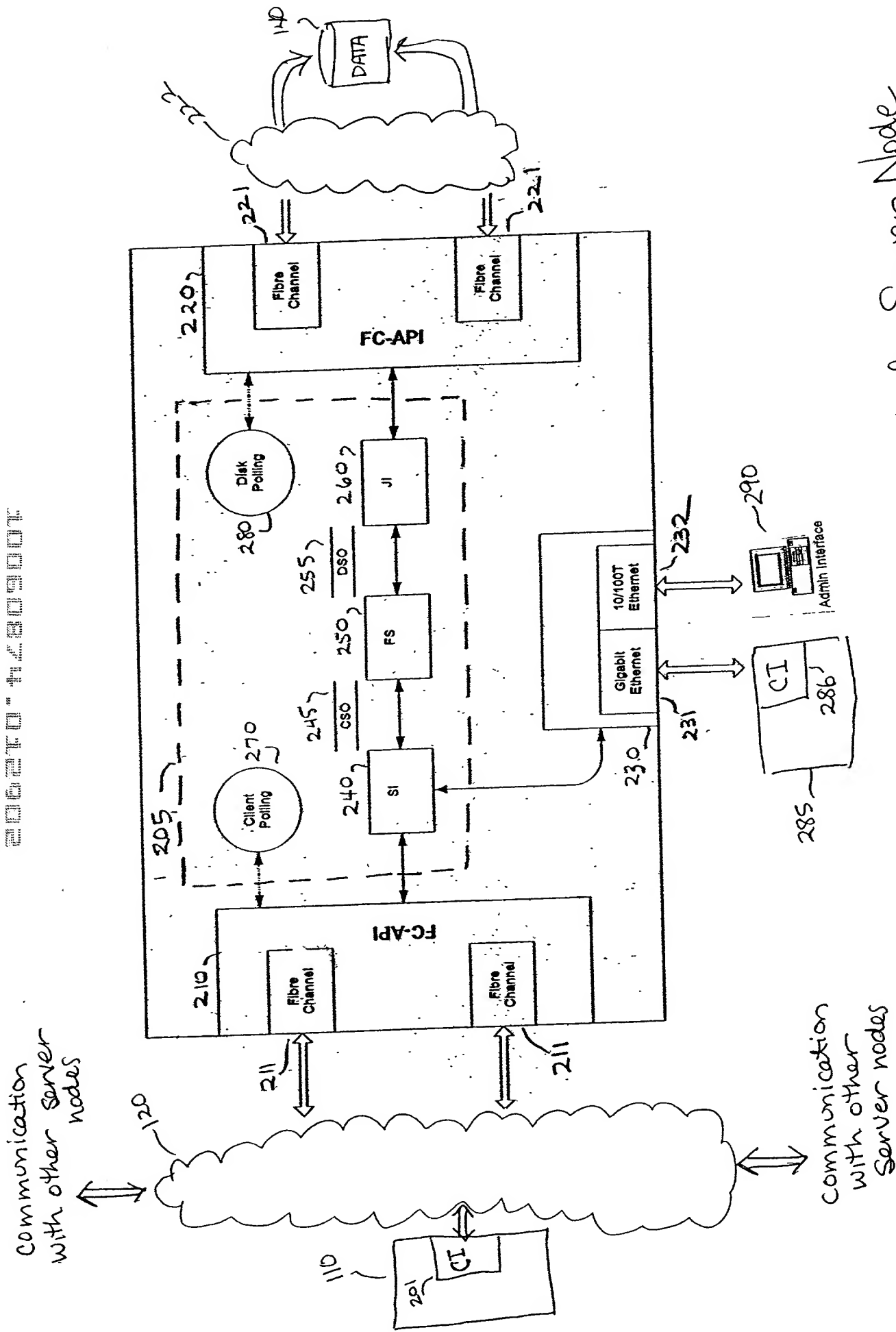


FIGURE 2 : One Embodiment of a Server Node

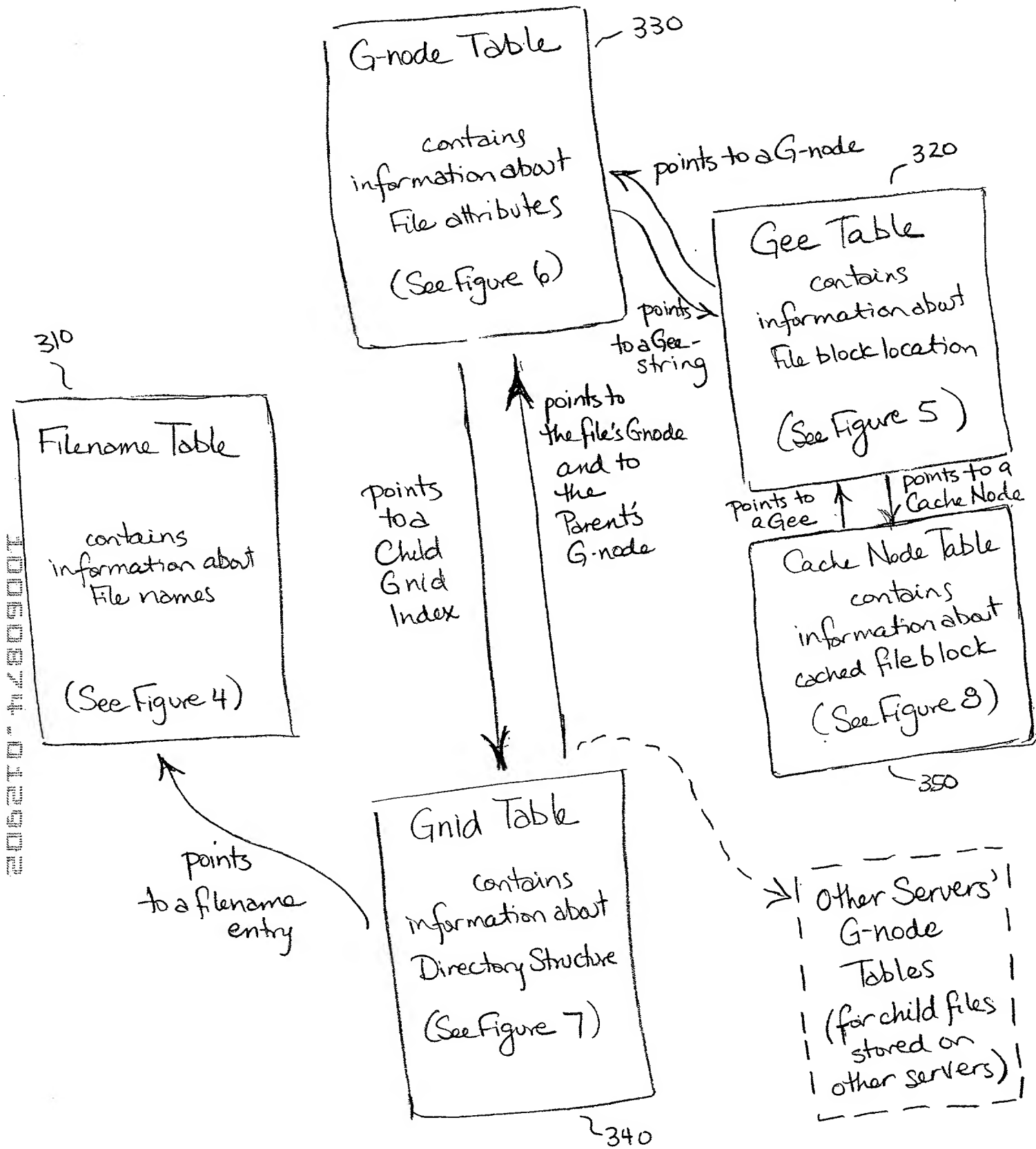


FIGURE 3 - Five metadata structures

206270-42809007

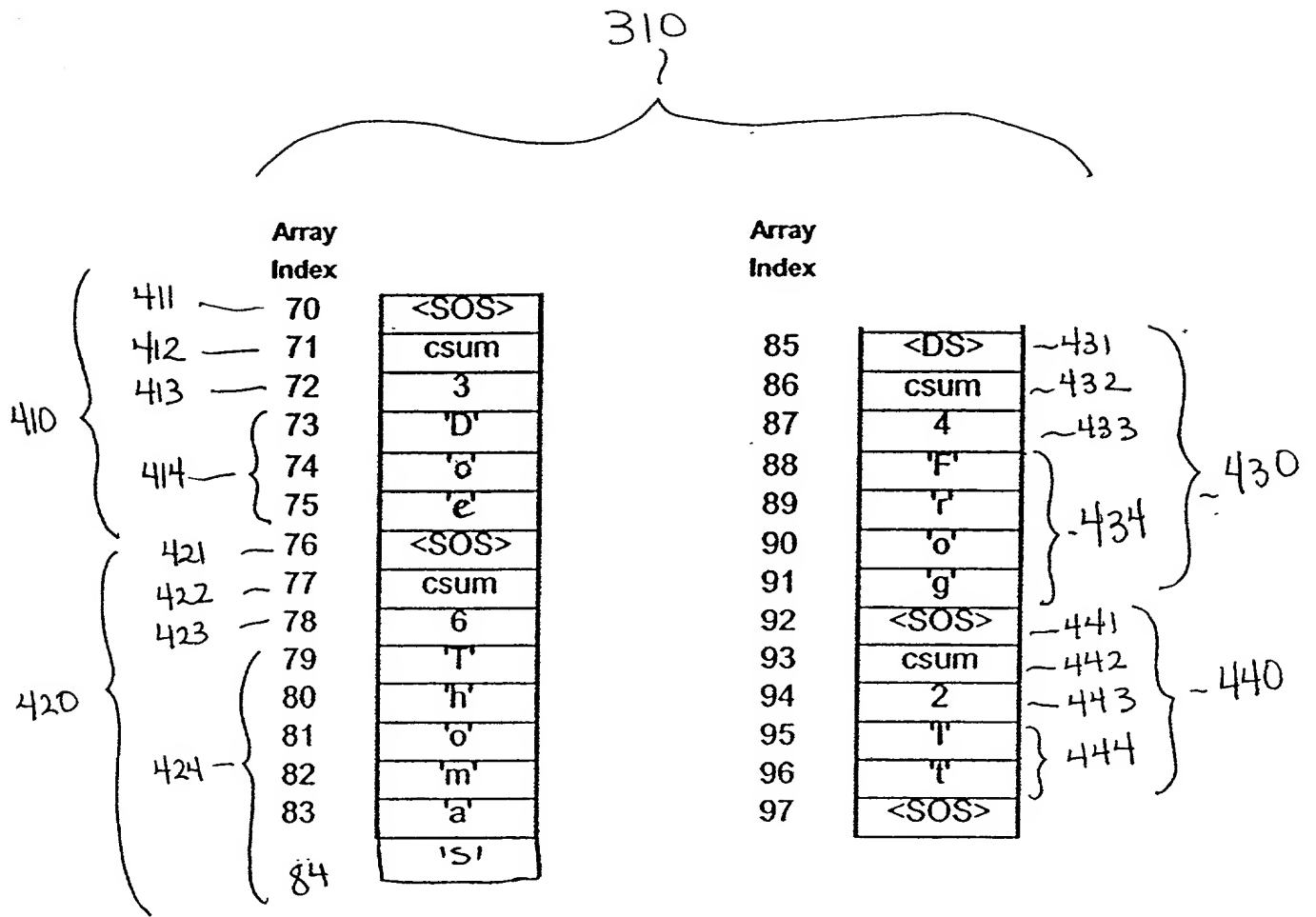


FIGURE 4- Sample Portion of a Filename Table

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205270-428007

	Index	G-Code	Data	File Logical Block
S10-	45	GNODE	Gnode = 67, Extent = 2, Root = TRUE	
S11-	46	DATA	Disk Logical Blocks: 456, 457 Drive 13	1
S12-	47	DATA	Disk Logical Blocks: 667, 668 Drive 15	2
S13-	48	DATA	Disk Logical Blocks: 112, 113 Drive 19	3
S14-	49	PARITY	Disk Logical Blocks: 554, 555 Drive 2	
S15-	50	DATA	Disk Logical Blocks: 458, 459 Drive 13	4
S16-	51	DATA	Disk Logical Blocks: 669, 670 Drive 15	5
S17-	52	DATA	Disk Logical Blocks: 119, 120 Drive 19	6
S18-	53	PARITY	Disk Logical Blocks: 556, 557 Drive 2	
S19-	54	LINK	Index 76	
	
S20-	76	GNODE	Gnode = 67, Extent = 3, Root = FALSE	
S21-	77	DATA	Disk Logical Blocks: 460, 461, 462 Drive 13	7
S22-	78	DATA	Disk Logical Blocks: 671, 672, 673 Drive 15	8
S23-	79	PARITY	Disk Logical Blocks: 121, 122, 123 Drive 19	
S24-	80	LINK	Index 88	
	
S25-	88	GNODE	Gnode = 67, Extent = 3, Root = FALSE	
S26-	89	DATA	Disk Logical Blocks: 463, 464, 465 Drive 13	9
S27-	90	DATA	Disk Logical Blocks: 674, 675, 676 Drive 15	10
S28-	91	PARITY	Disk Logical Blocks: 124, 125, 126 Drive 19	
S29-	92	GNODE	Gnode = 43, Extent = 4, Root = FALSE	
	

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FIGURE 5 - Sample Portion of a Gee Table

Attribute Data	
602	File Attribute - type
604	File Attribute - mode
606	File Attribute - links
608	File Attribute - uid
610	File Attribute - gid
612	File Attribute - size
614	File Attribute - used
620	File Attribute - fileId
622	File Attribute - atime
624	File Attribute - mtime
626	File Attribute - ctime
628	Child Gnid Index
630	Gee Index - Last Used
631	Gee Offset - Last Used
632	Gee Index - Midpoint
633	Gee Offset - Midpoint
634	Gee Index - Tail
635	Gee Offset - Tail
636	Gee Index - Root
638	Gnode Status
640	Quick Shot Status
642	Quick Shot Link

600

FIGURE 6 - G-NODE ATTRIBUTES

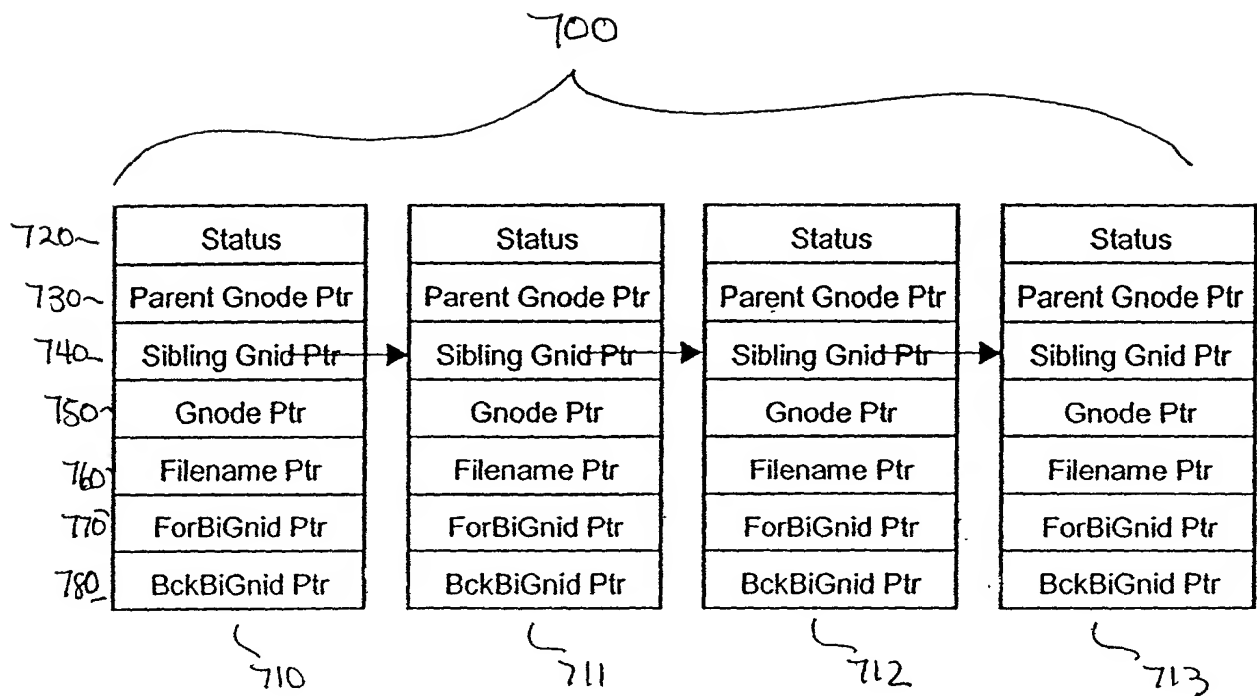


FIGURE 7- Structure of a Gnid String

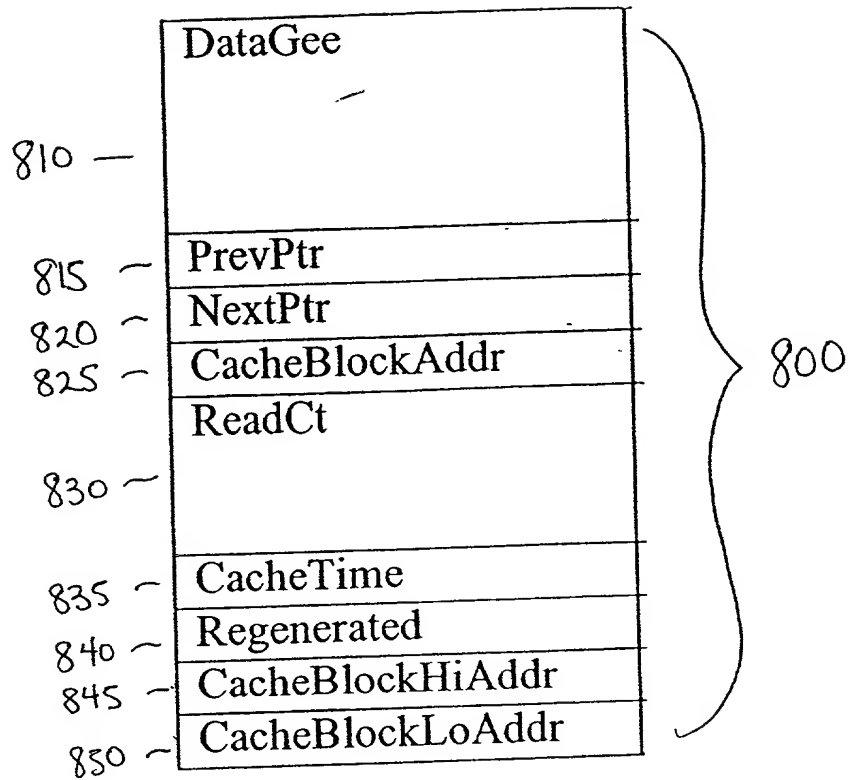


FIGURE 8a - Structure of a Cache Node

350

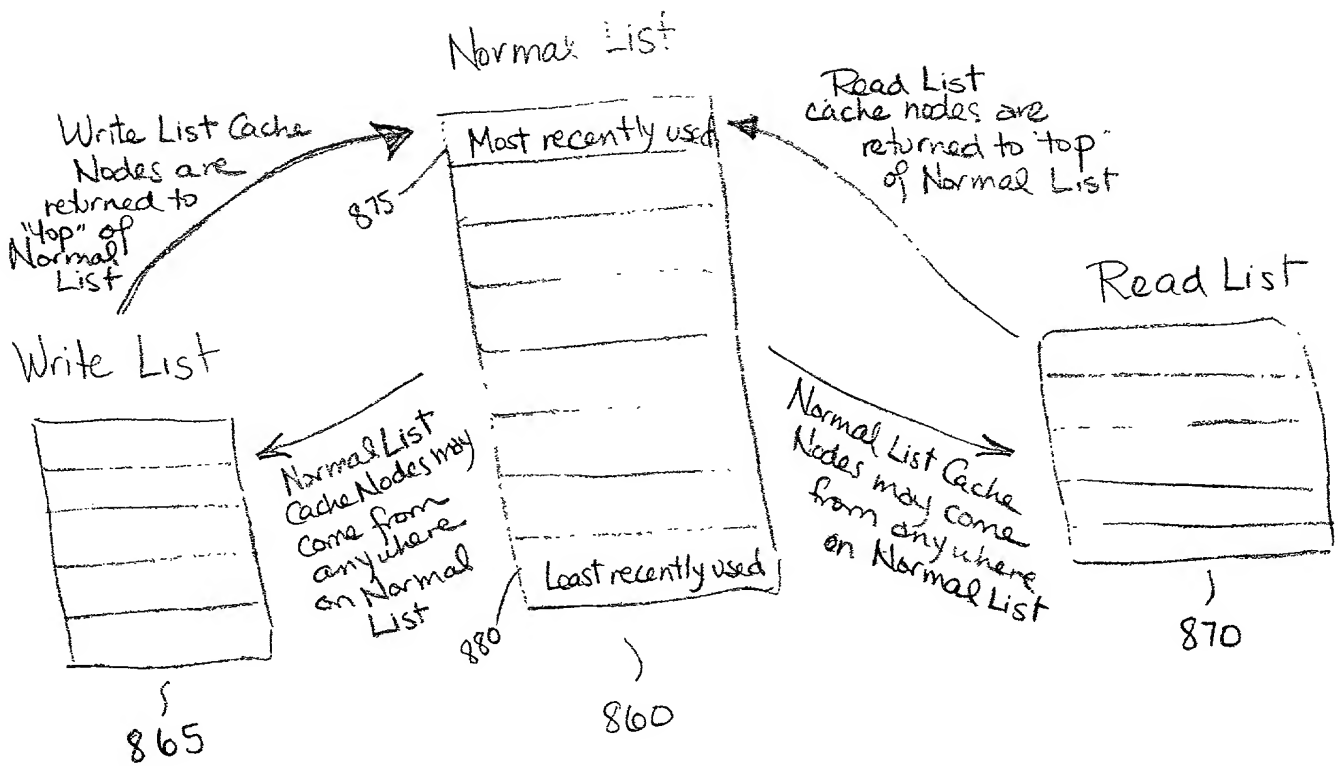


FIGURE 8B - Conceptual division of a Cache Node Table into Three Lists

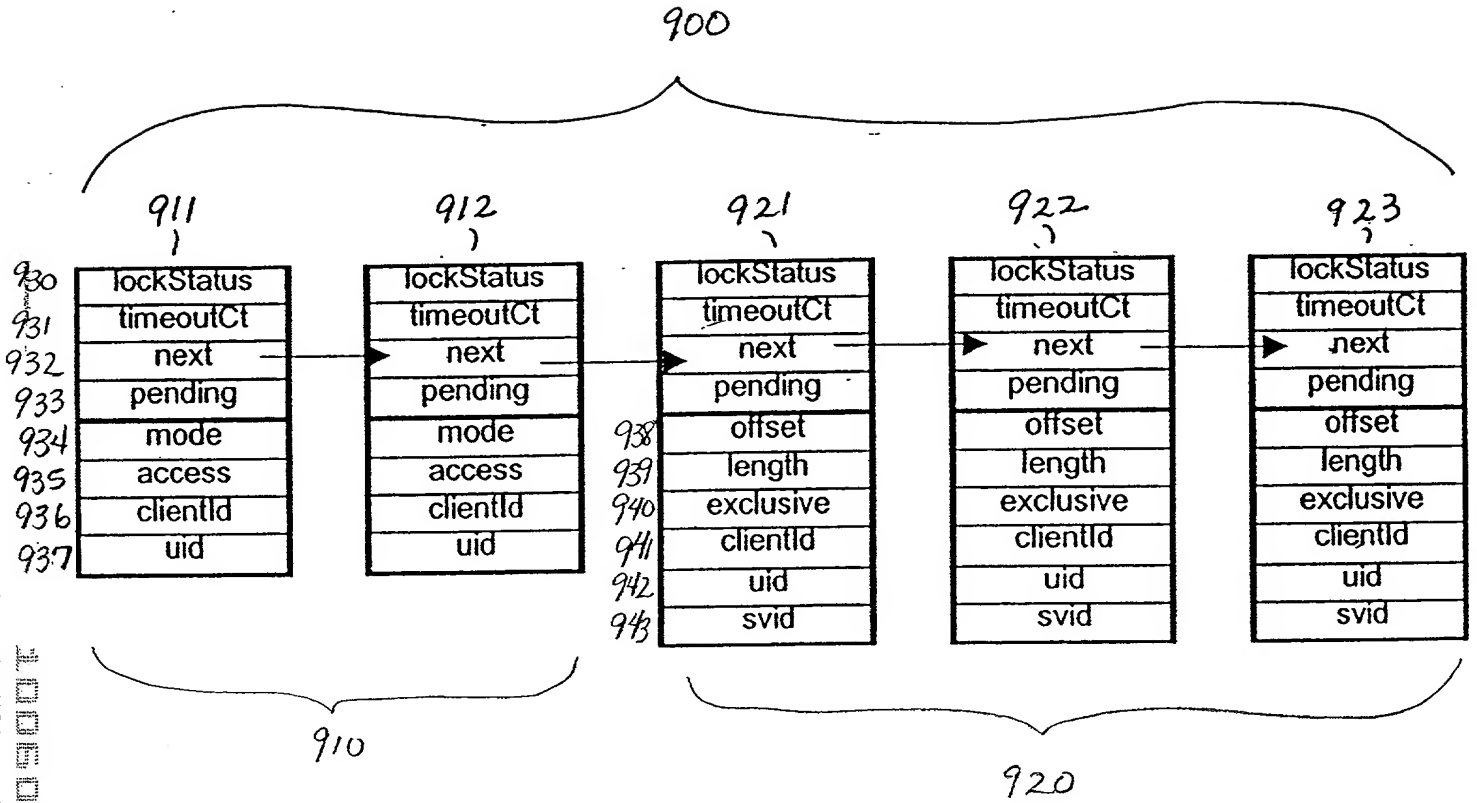


FIGURE 9 - A Sample Lock String

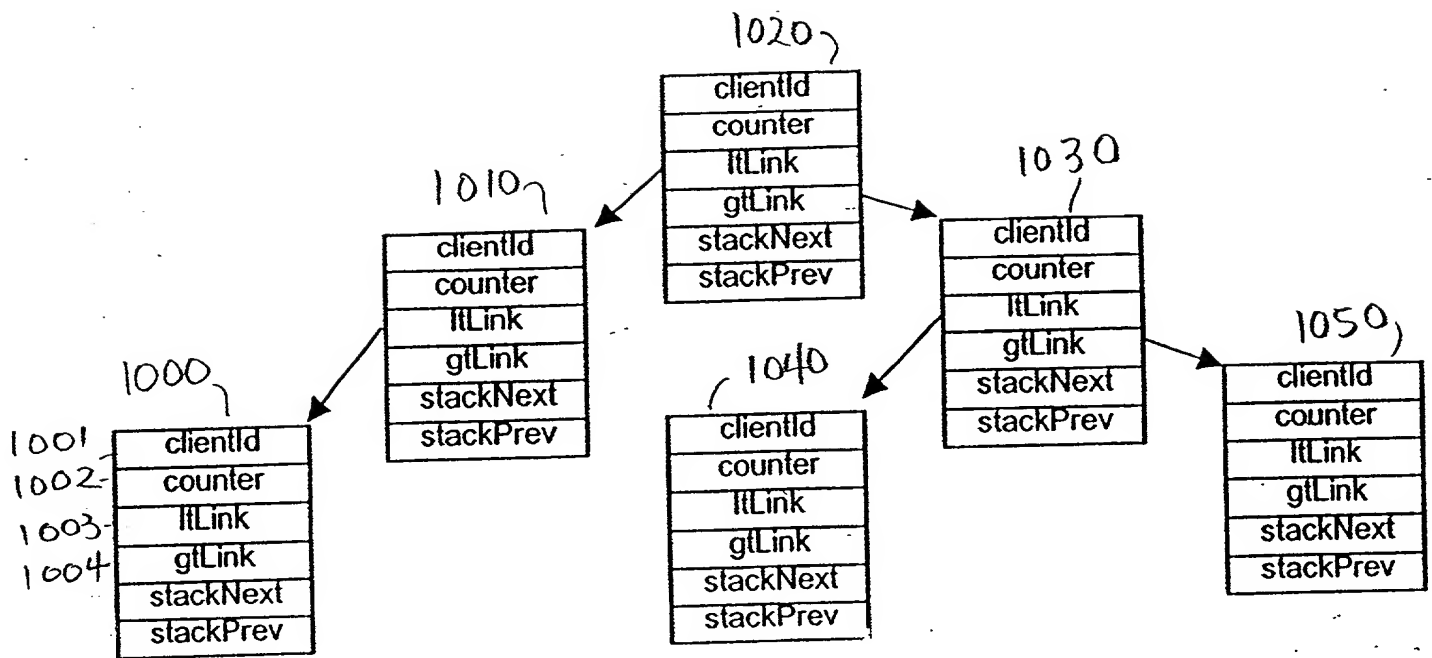


FIGURE 10 - Refresh Nodes configured as a binary tree.

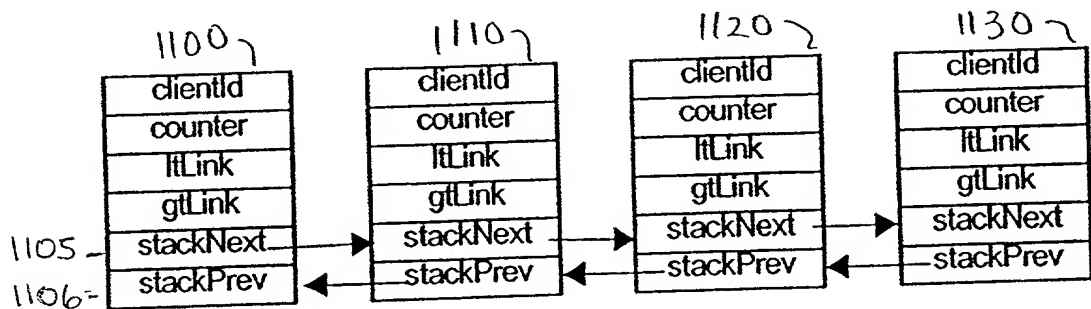


FIGURE 11 - Refresh Nodes configured as a doubly-linked list

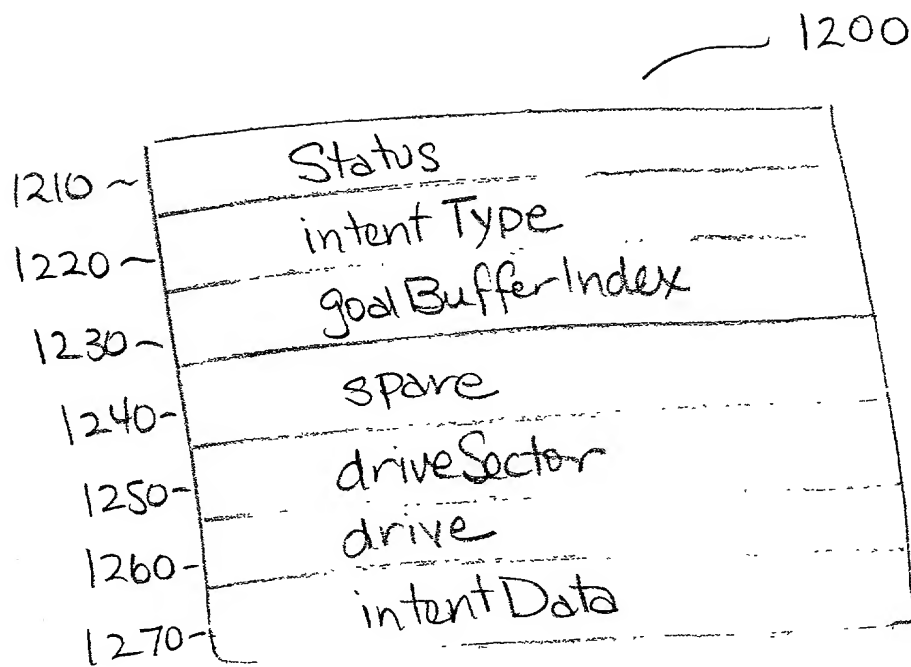


FIGURE 12 - Structure of an Intent Log Entry

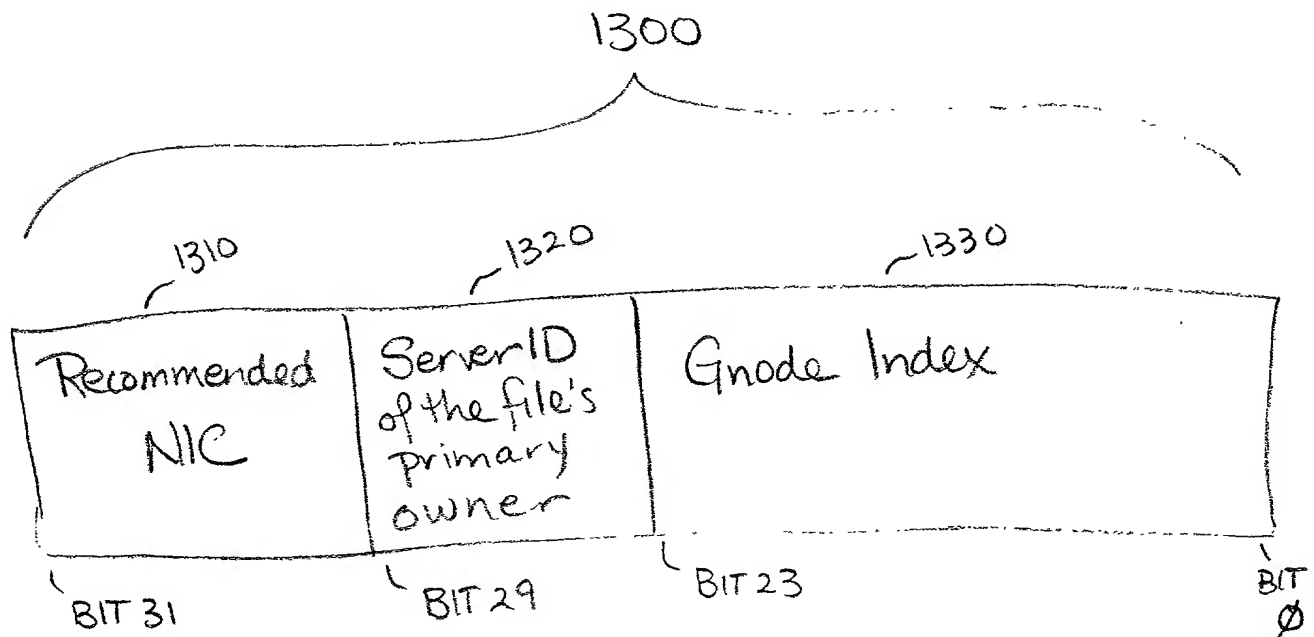


FIGURE 13 - Structure of a File Handle

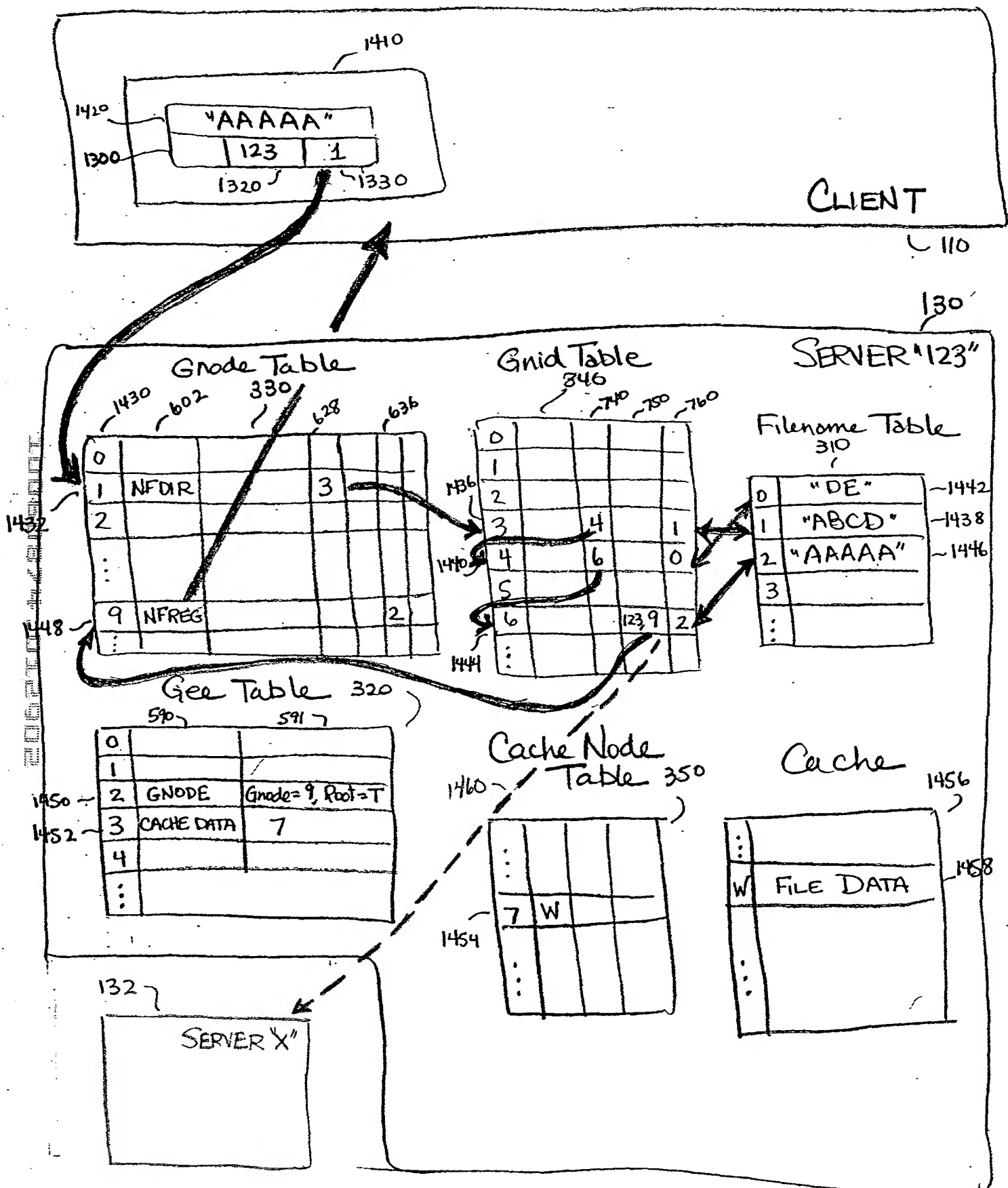


FIGURE 14a: Example of a File Look-Up

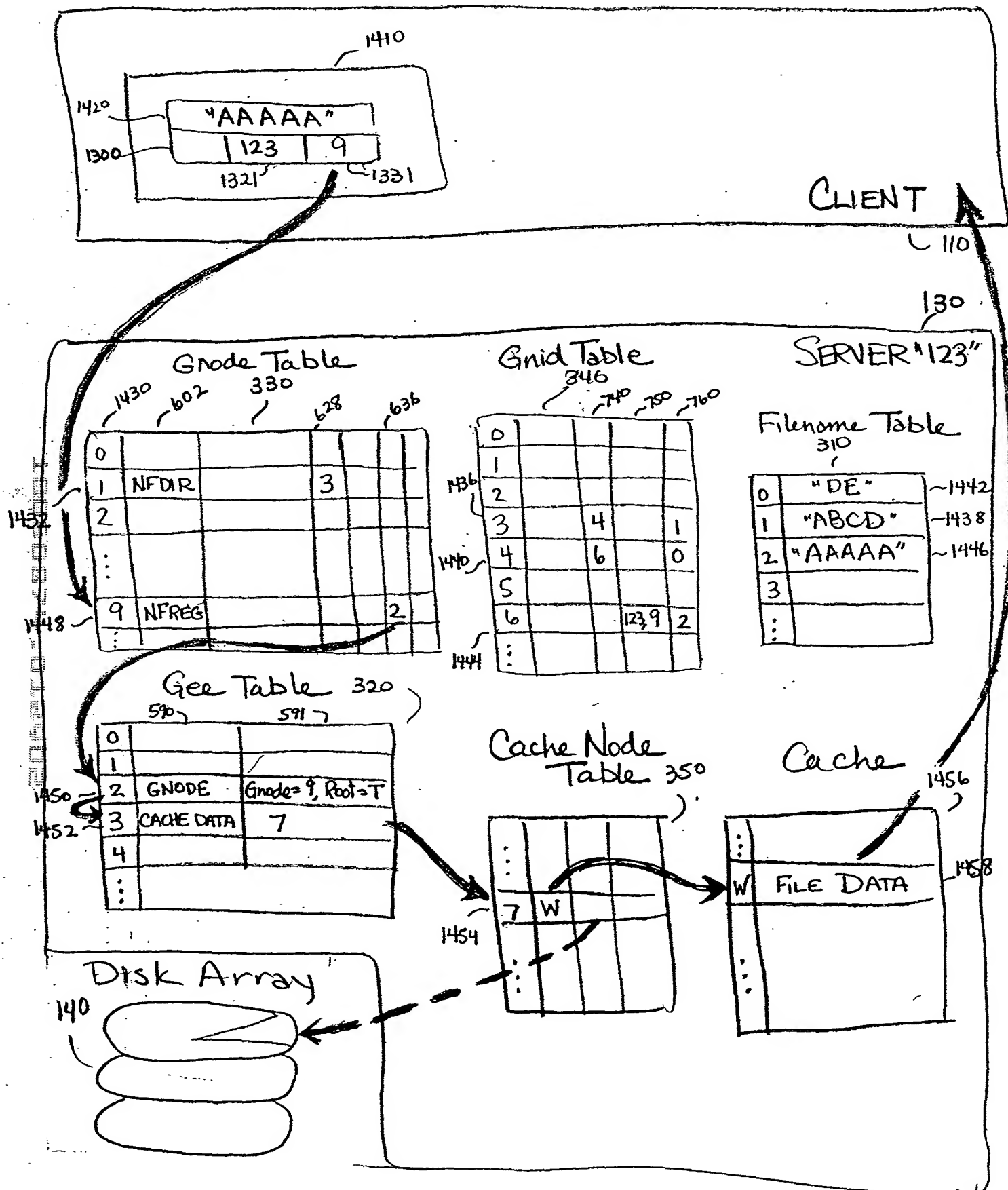


FIGURE 14b Example of a File Access

20250714-013002

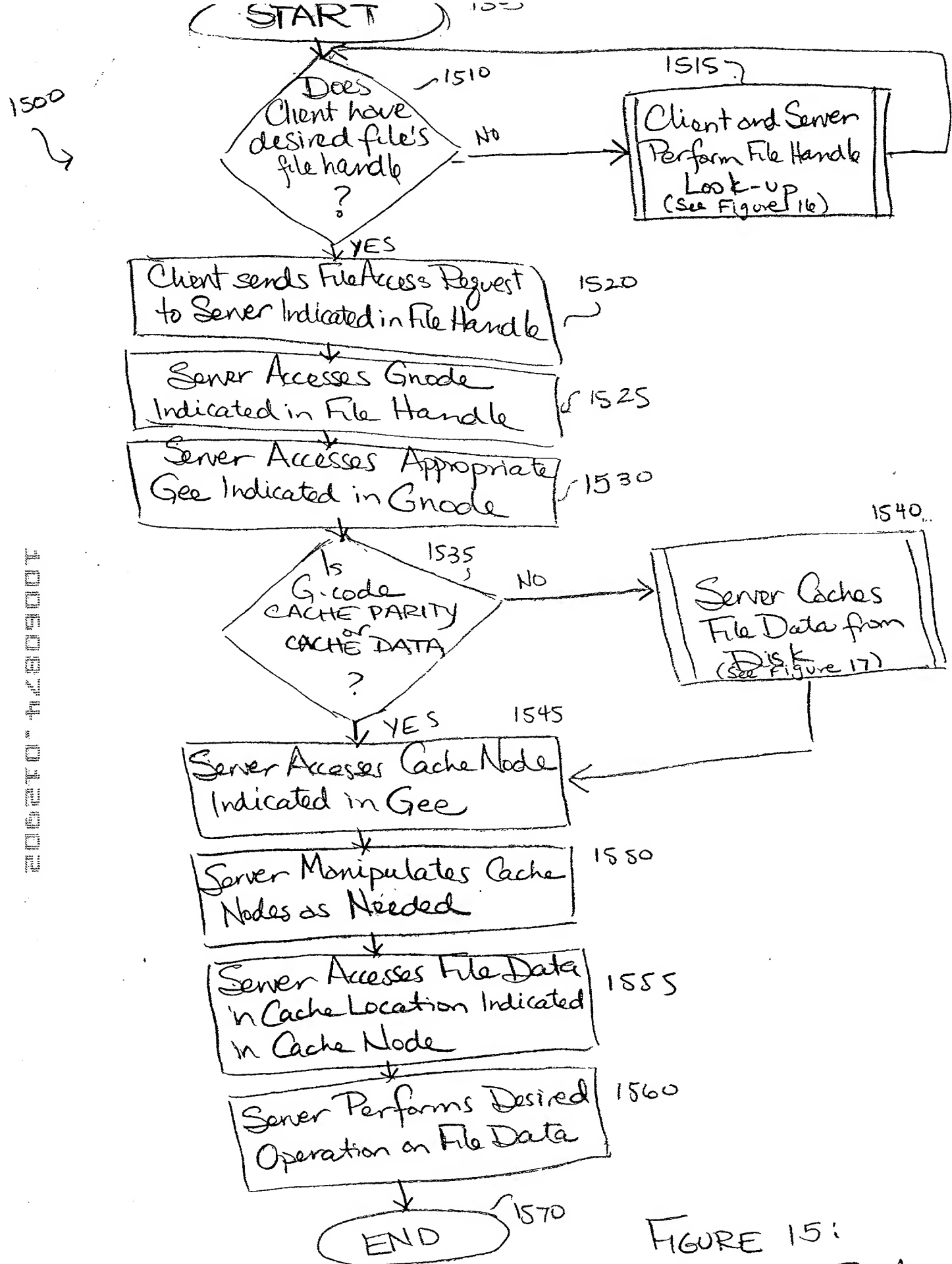


FIGURE 15:
Performing a File Access

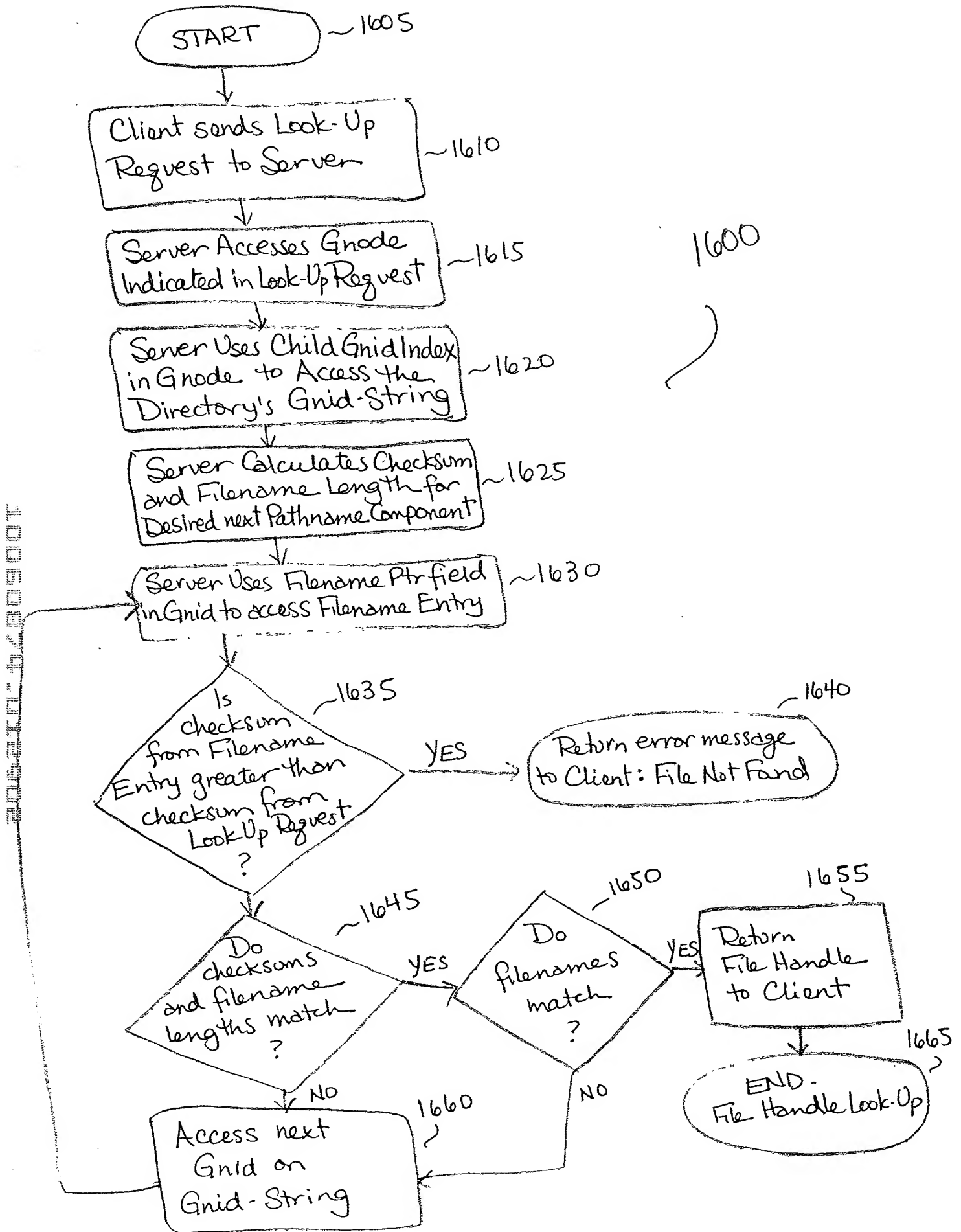


FIGURE 16: Performing a File Handle Look-Up

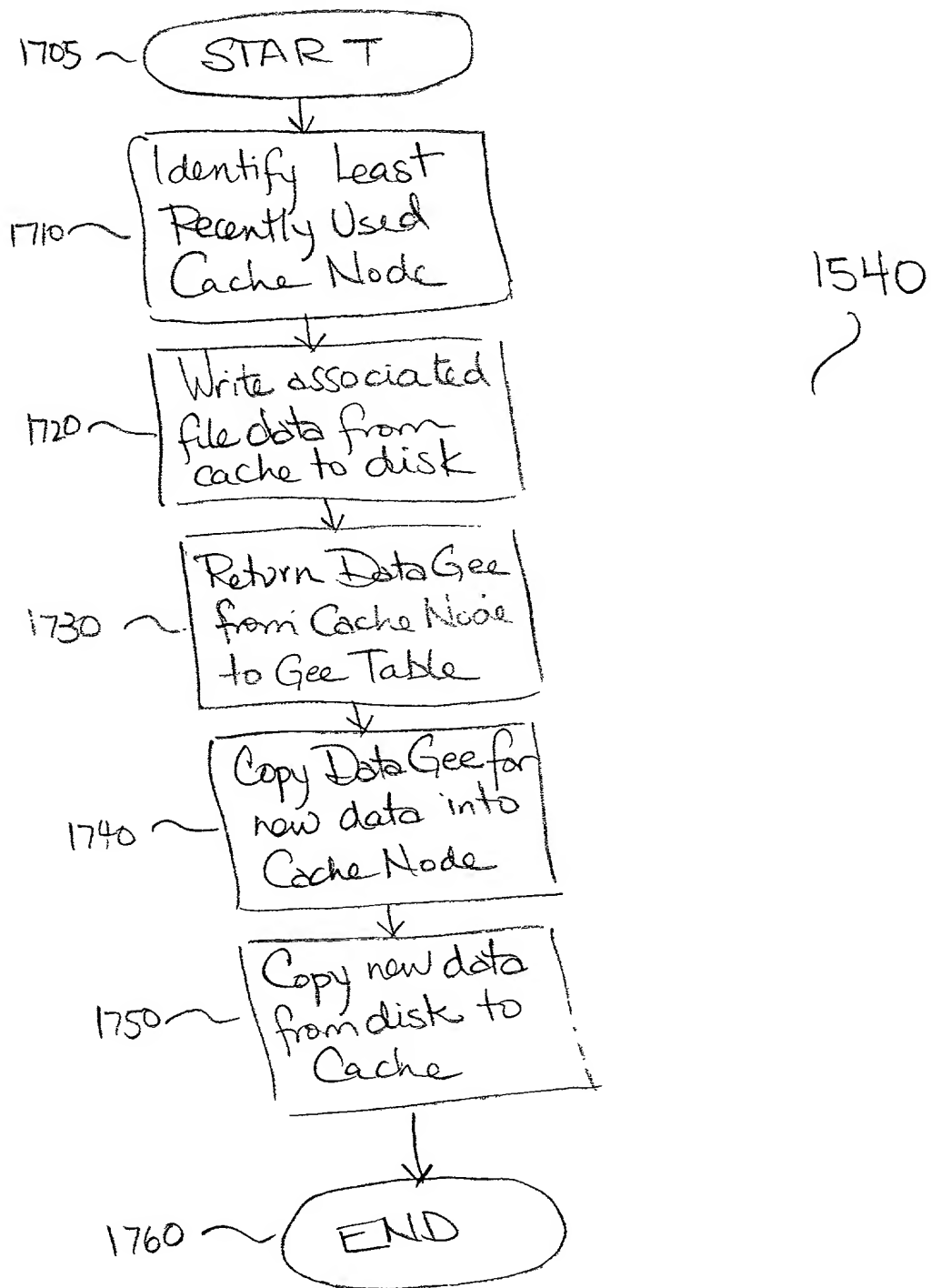


FIGURE 17: Caching File Data

206274.012902

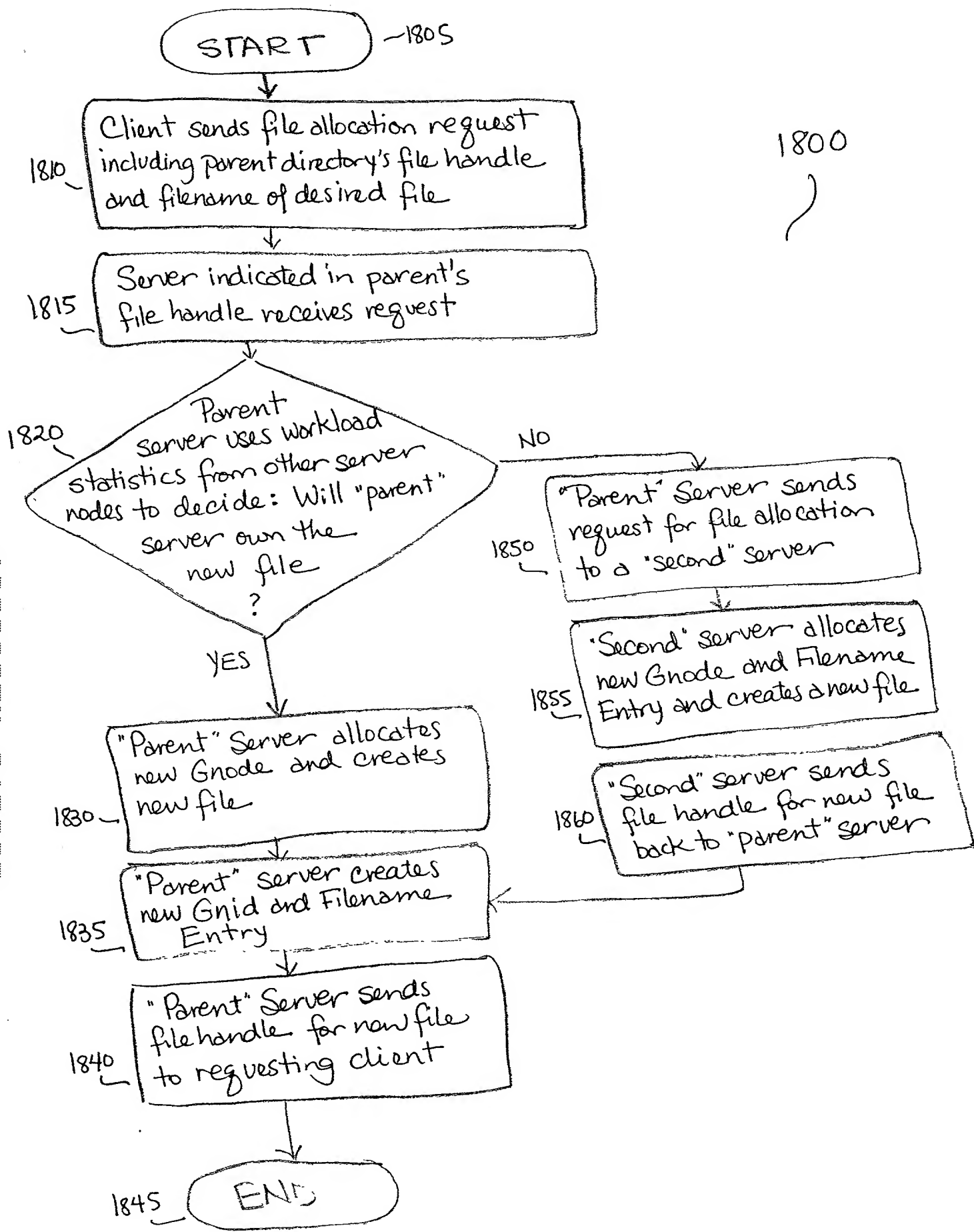


FIGURE 18 - File Allocation

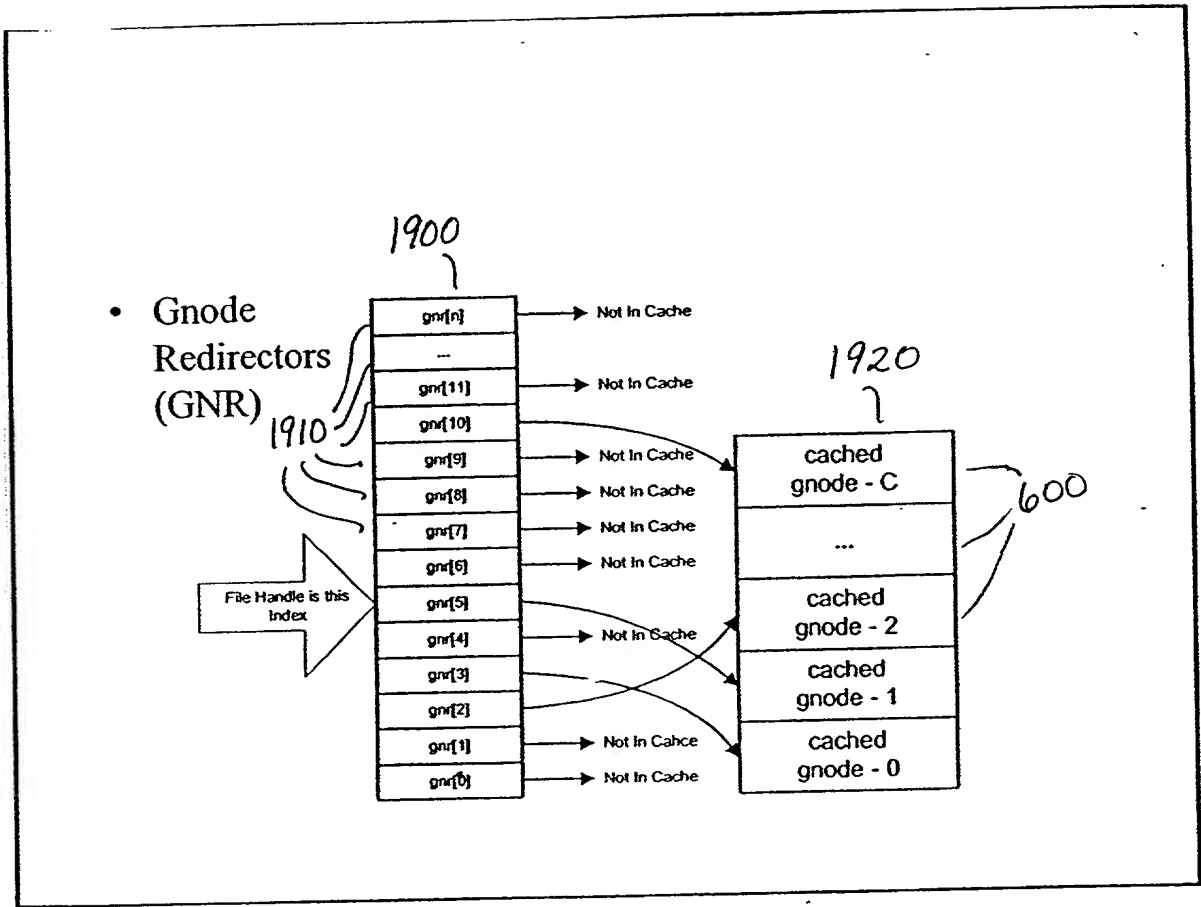


FIGURE 19

206210-1280901

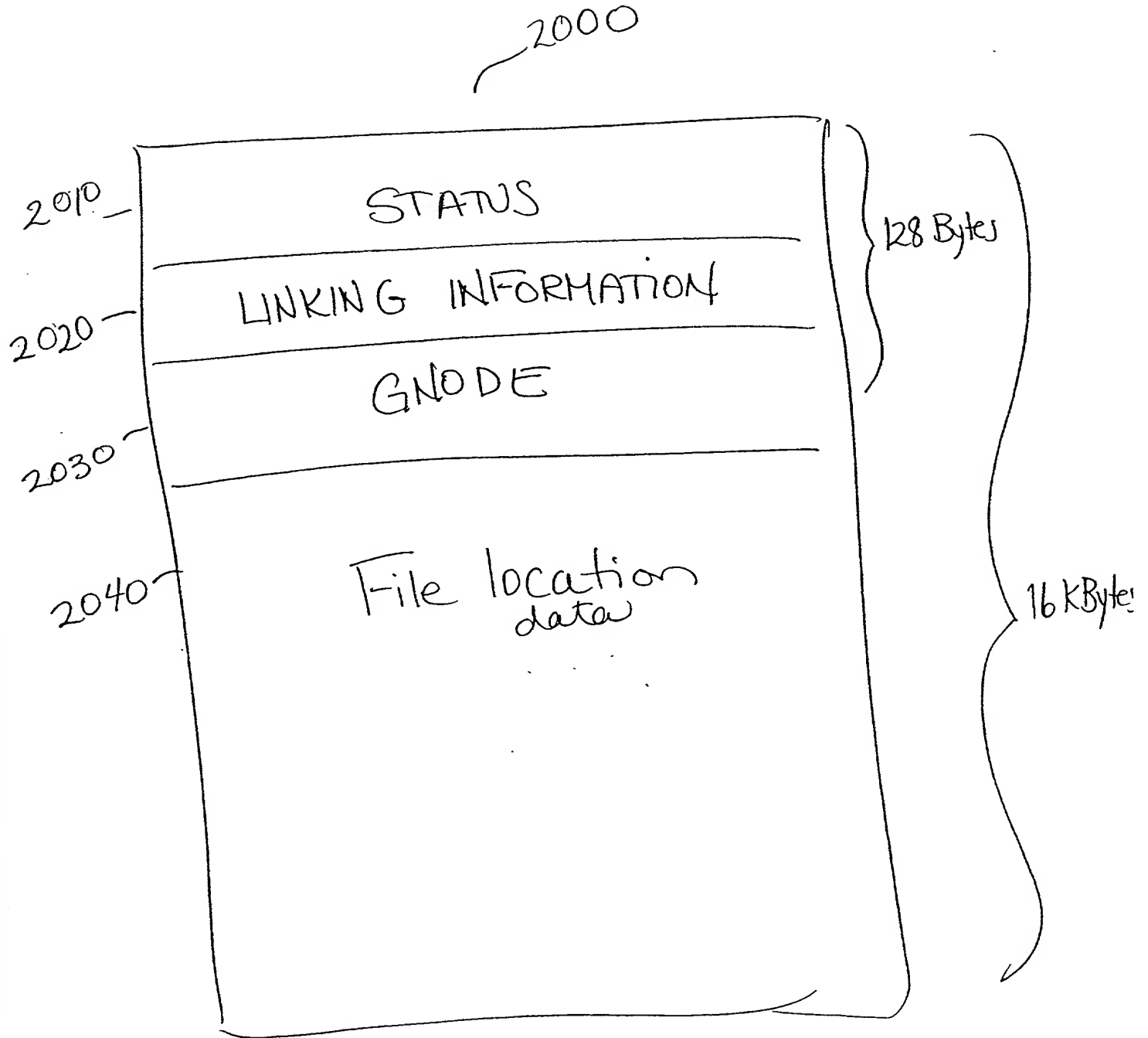


Figure 20a

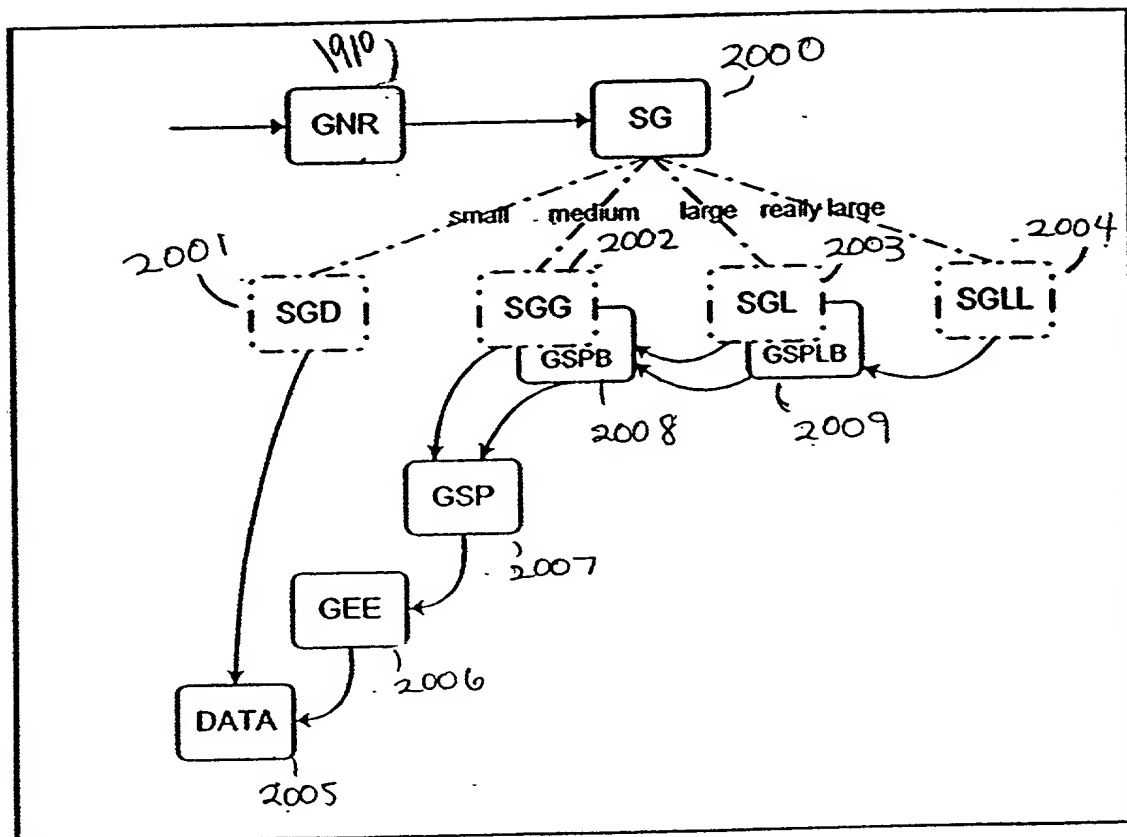


FIGURE 20b

CONVENTIONAL RAID MAPPING (PRIOR ART)

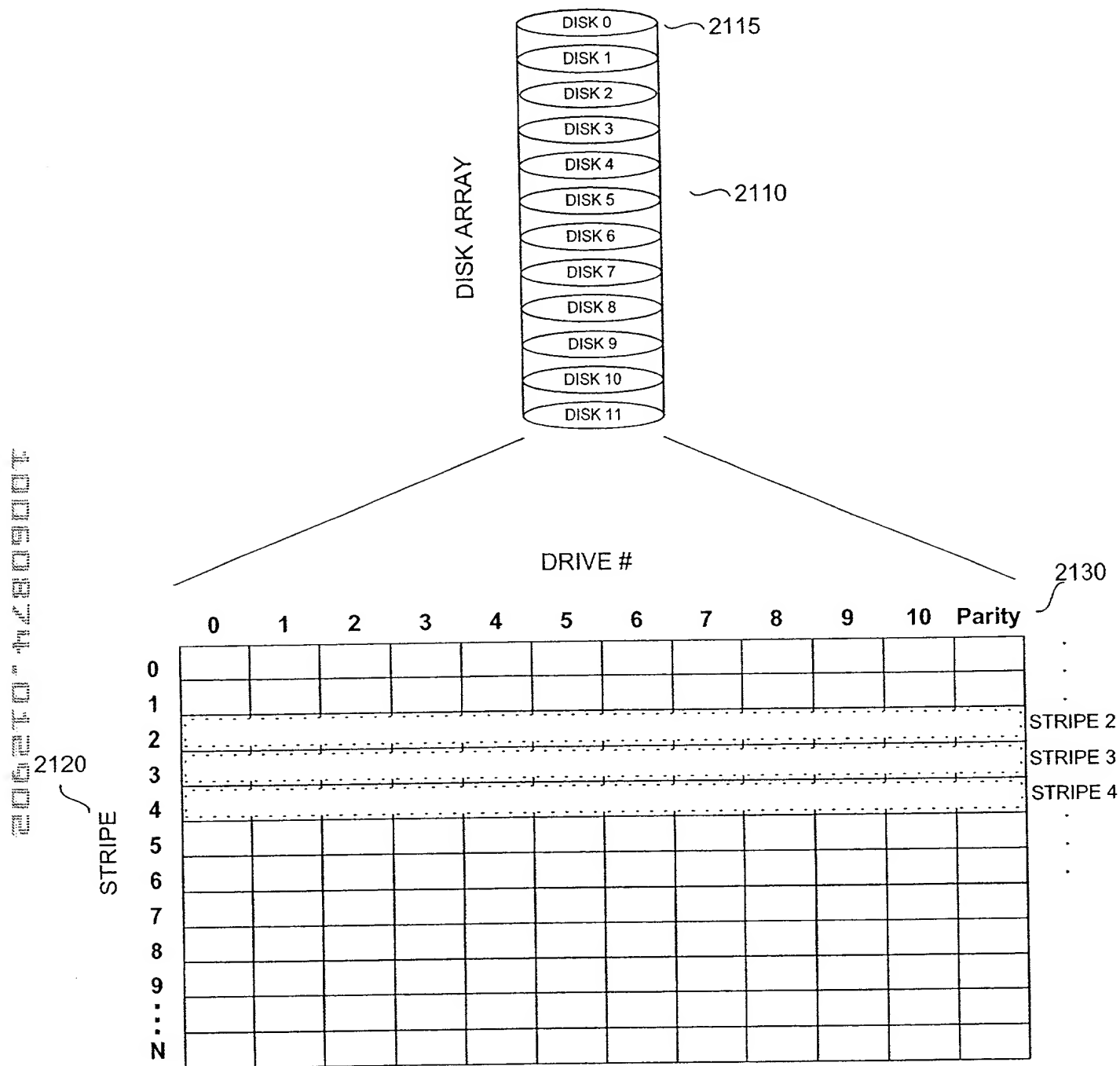


FIGURE 21

FIGURE 22A

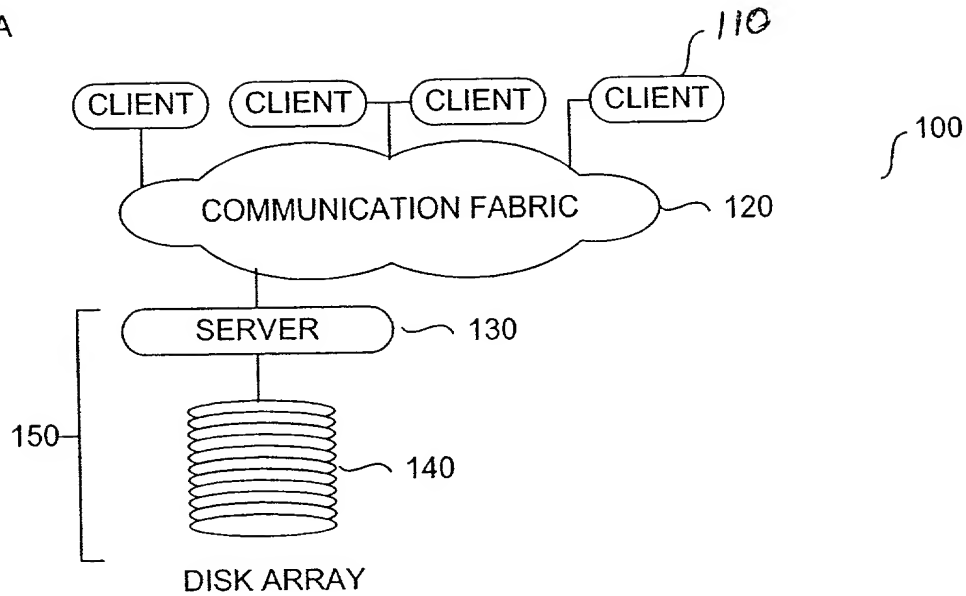


FIGURE 22B

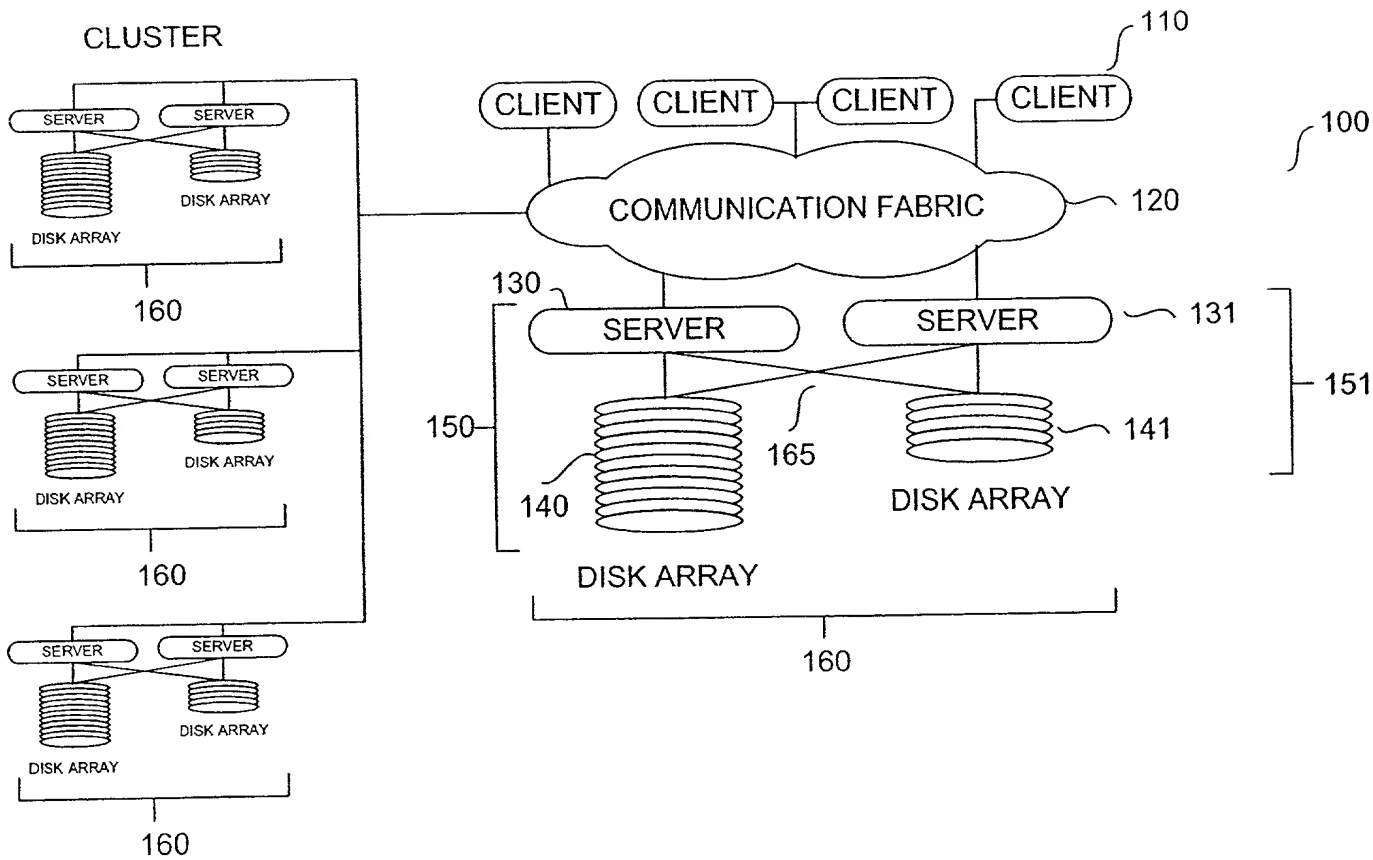


FIGURE 23

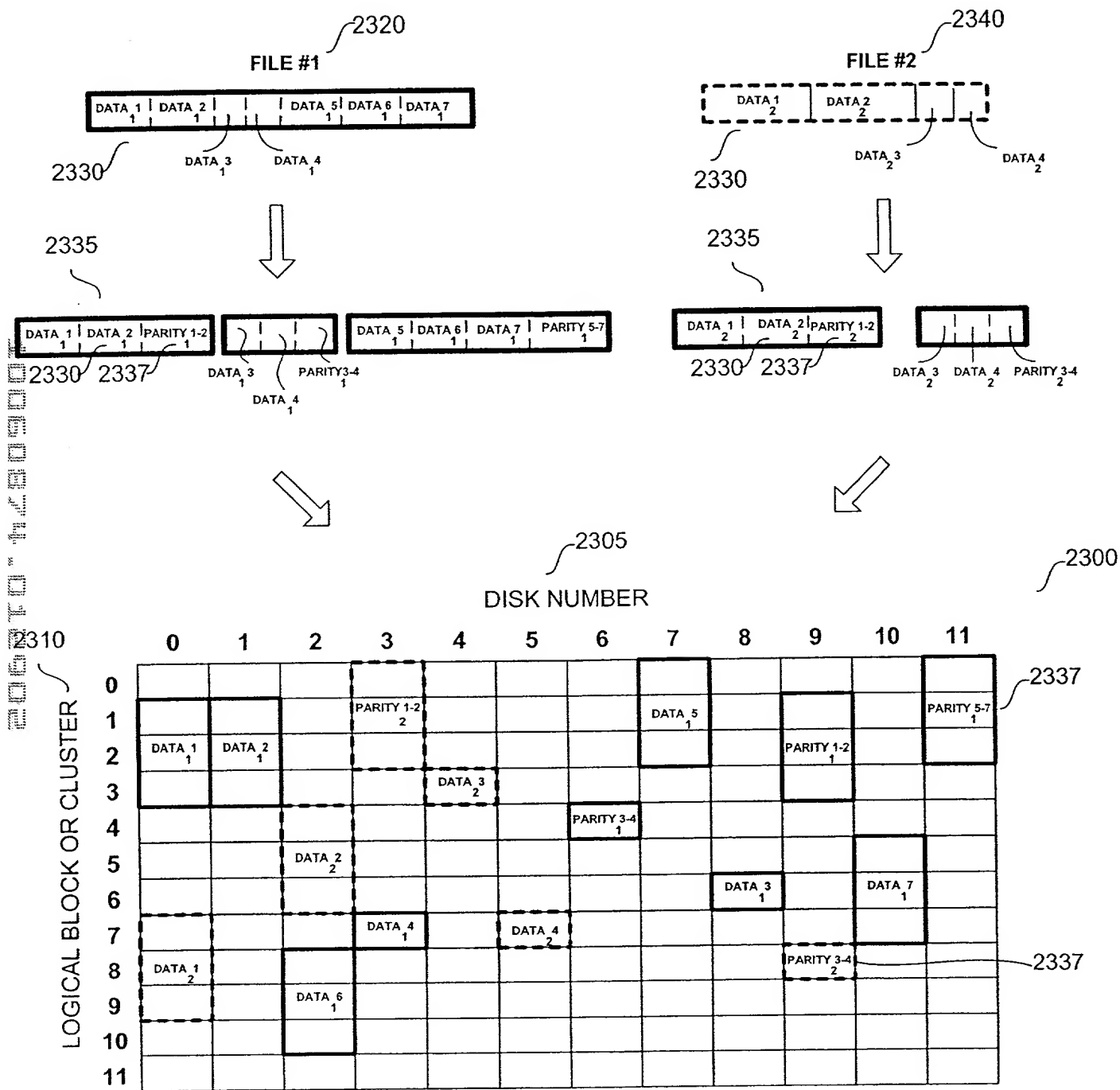


FIGURE 24A

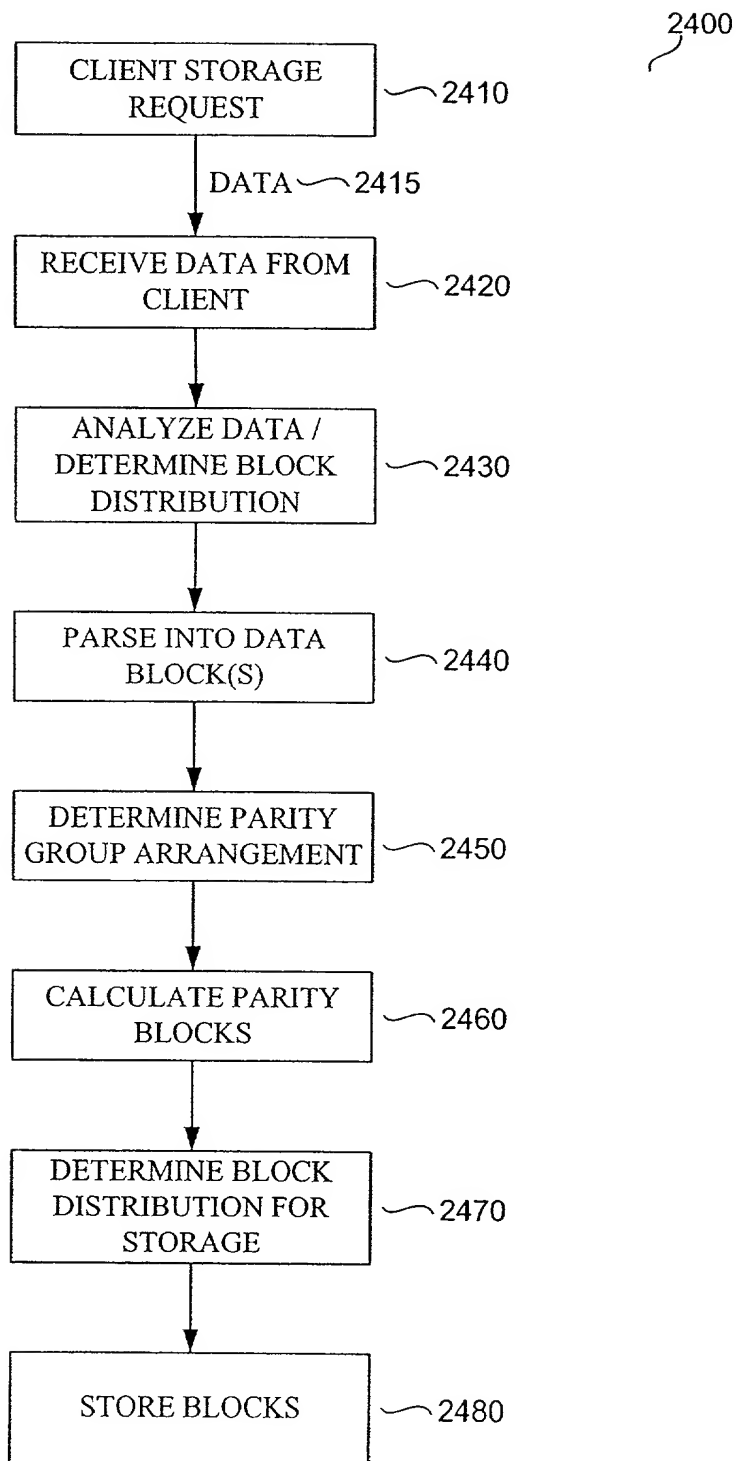


FIGURE 24B

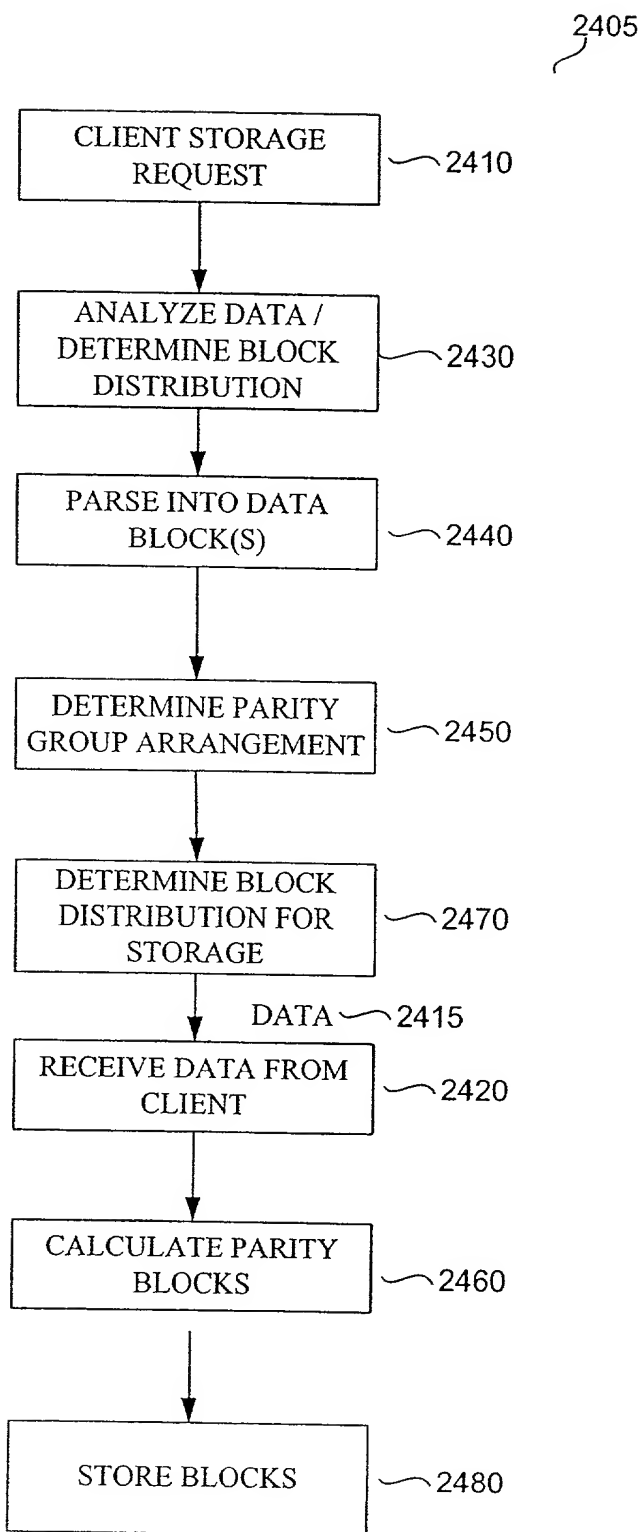


FIGURE 25

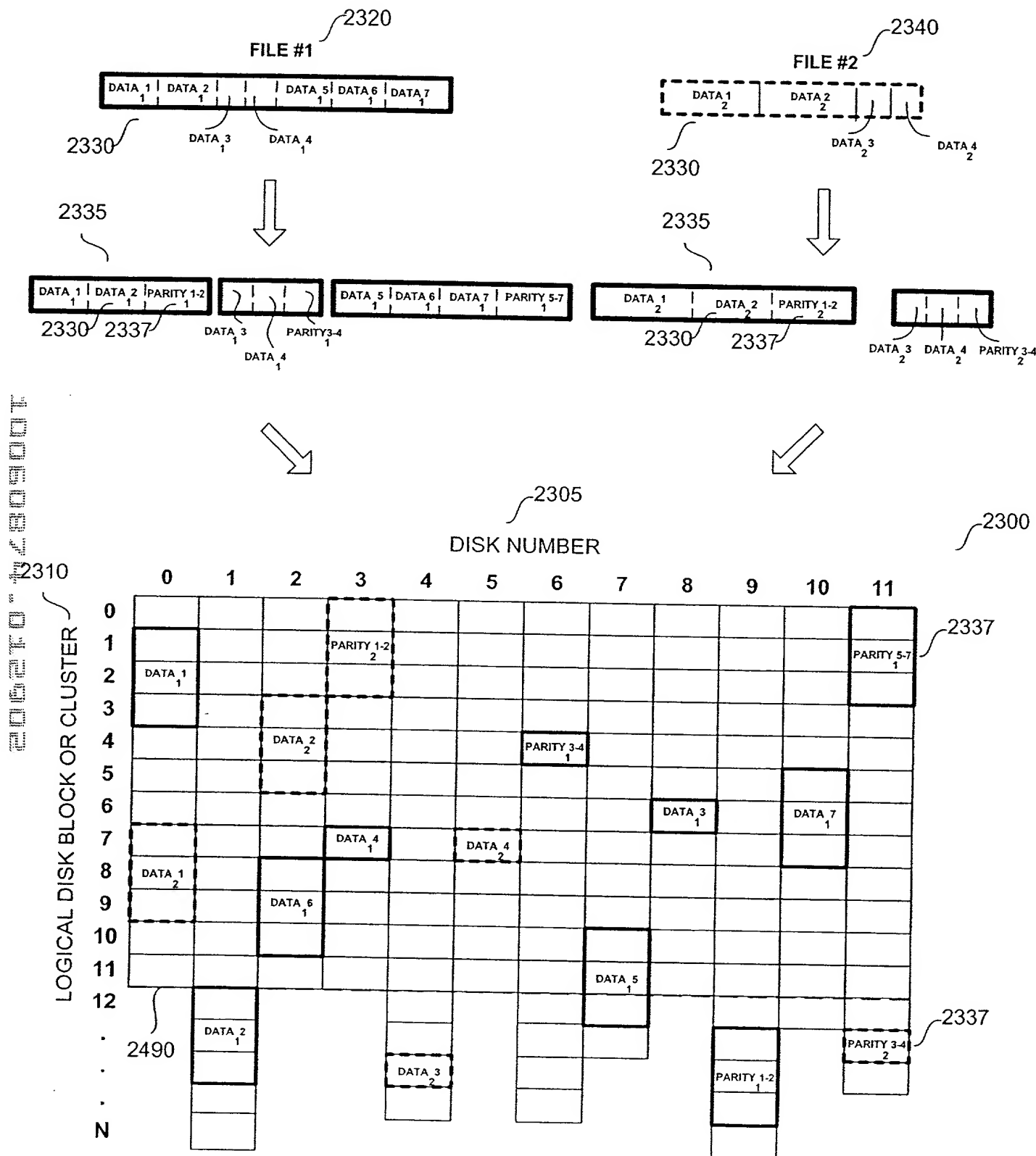


FIGURE 26A

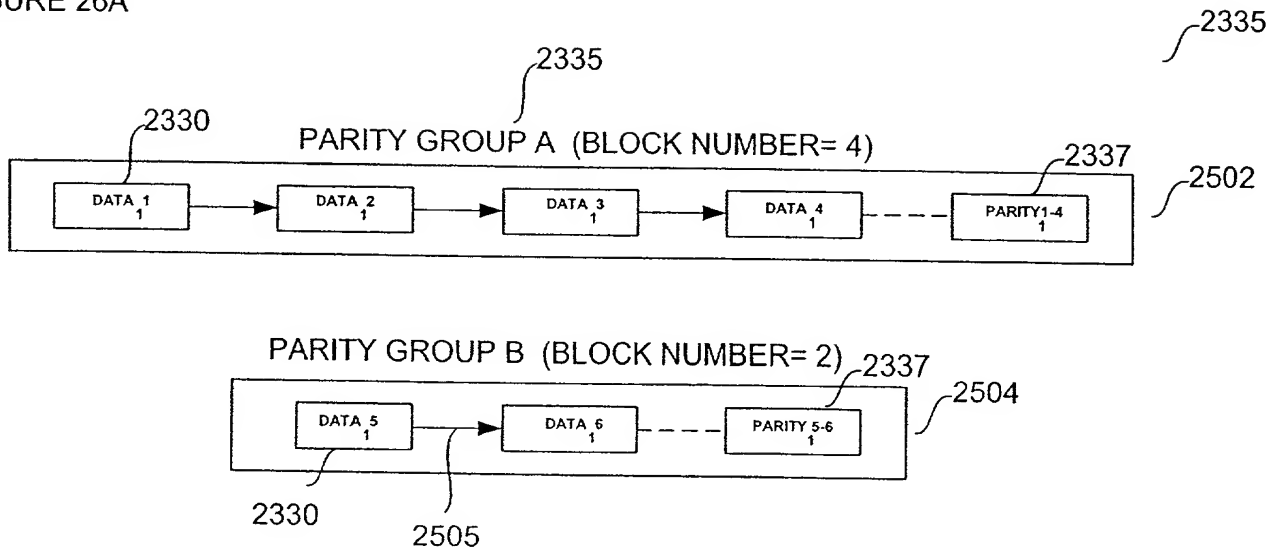
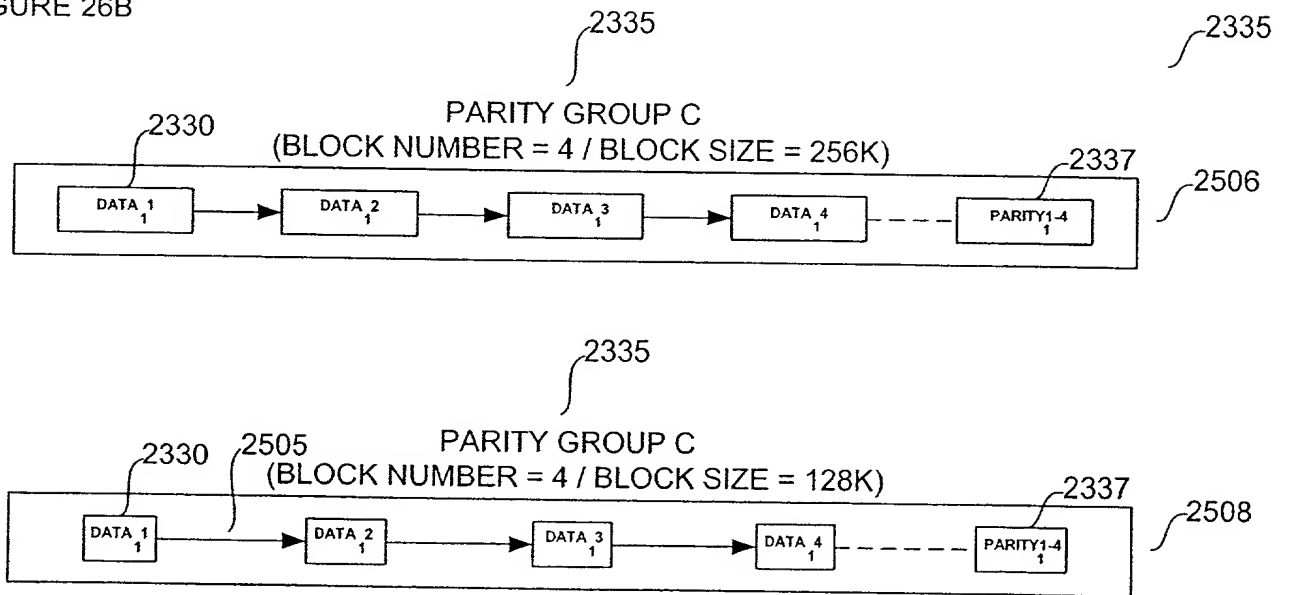


FIGURE 26B



DISK ARRAY INITIALIZATION USING GEE TABLE
SPACE ALLOCATION

2530

206270-1180007

2532		2534	2536		
INDEX		G-CODE	DATA	2542	
...			
45		GNODE	EXTENT=2		
46		DATA	BLOCKS 456, 457: Drive 13		
47		DATA	BLOCKS 667, 668: Drive 15		
48		DATA	BLOCKS 112, 113: Drive 19		
49		PARITY	BLOCKS 554, 555: Drive 2		
...			
76		GNODE	EXTENT=3		
77		DATA	BLOCKS 460, 461, 462: Drive 13		
78		DATA	BLOCKS 671, 672, 673: Drive 15		
79		PARITY	BLOCKS 121, 122, 123: Drive 19		
...			
88		GNODE	EXTENT=2		
89		DATA	BLOCKS 463, 464, 465: Drive 2		
90		DATA	BLOCKS 674, 675, 676: Drive 5		
91		PARITY	BLOCKS 124, 125, 126: Drive 13		
...			

FIGURE 27

ARRAY PREPARATION / G-TABLE FORMATTING

2448

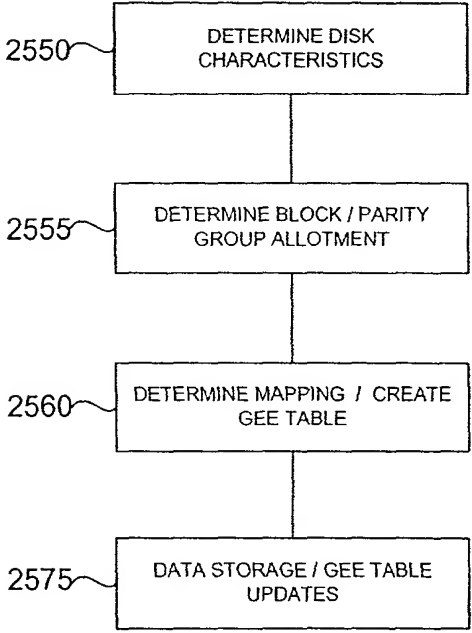


FIGURE 28

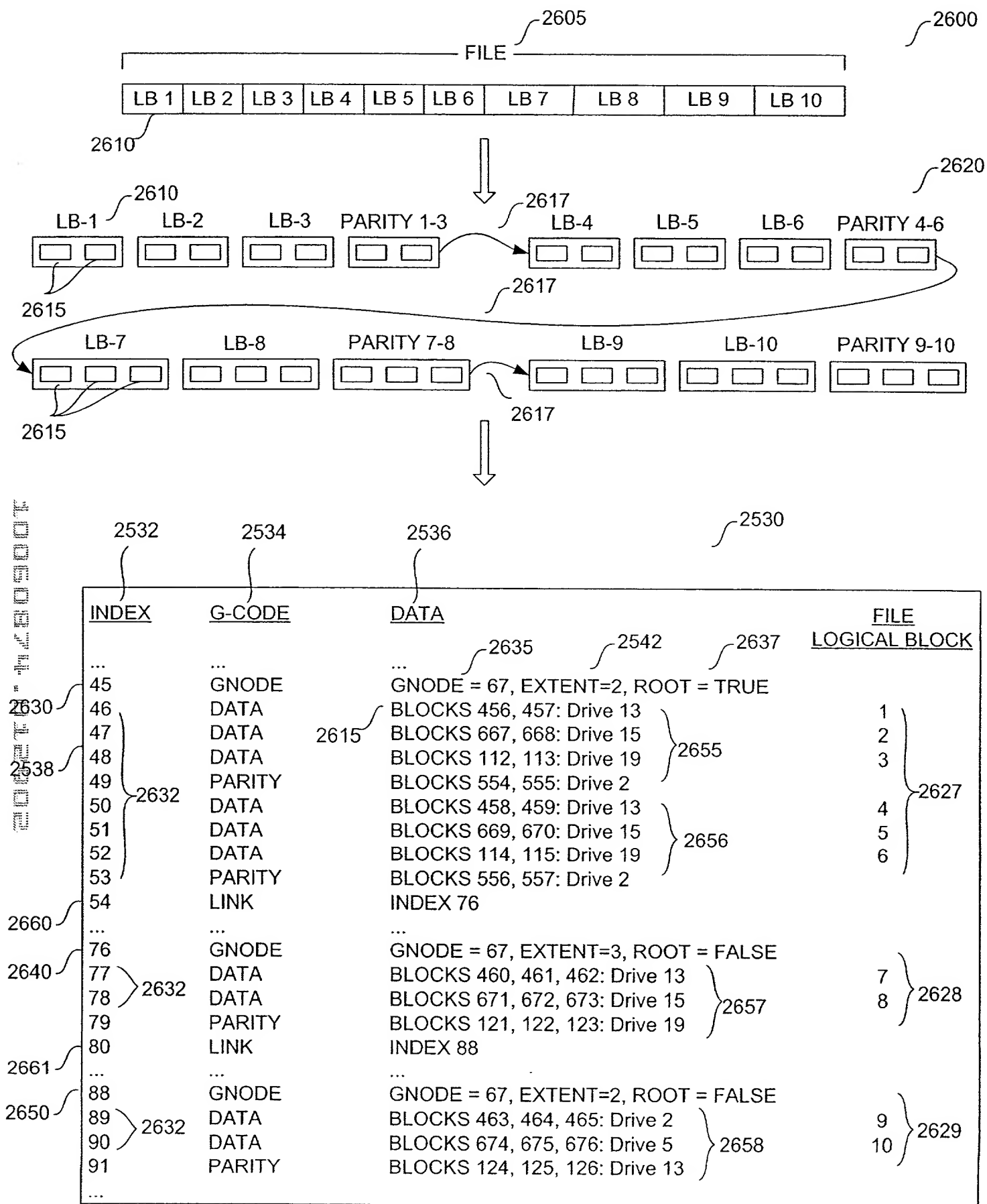


FIGURE 29

DRIVE FAILURE RECOVERY MECHANISM

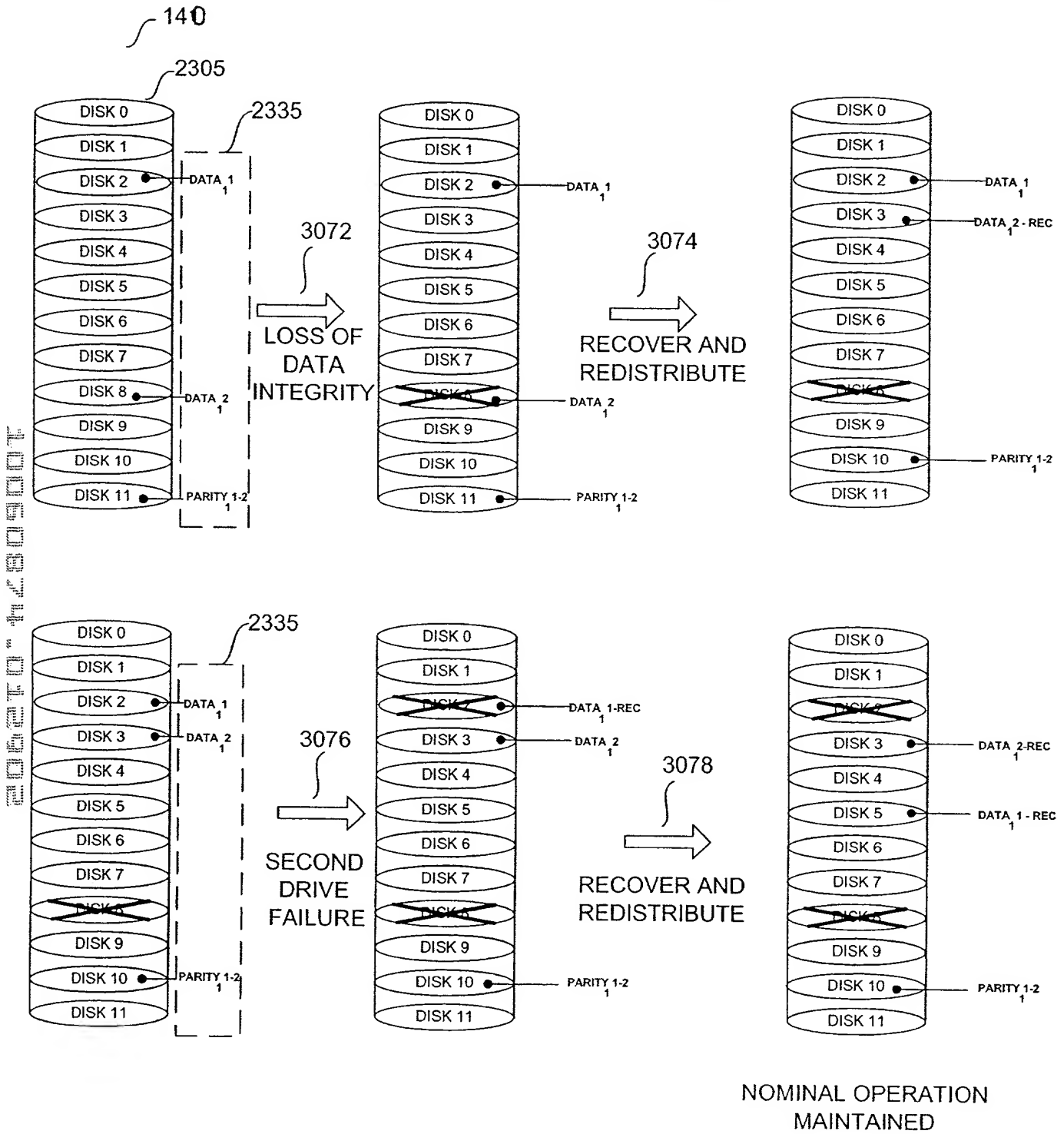


FIGURE 30

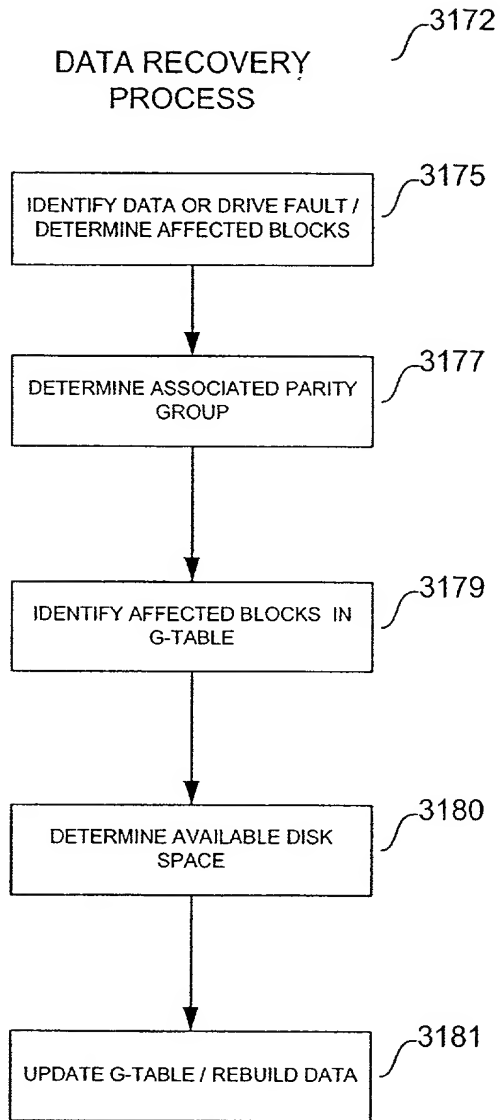


FIGURE 31

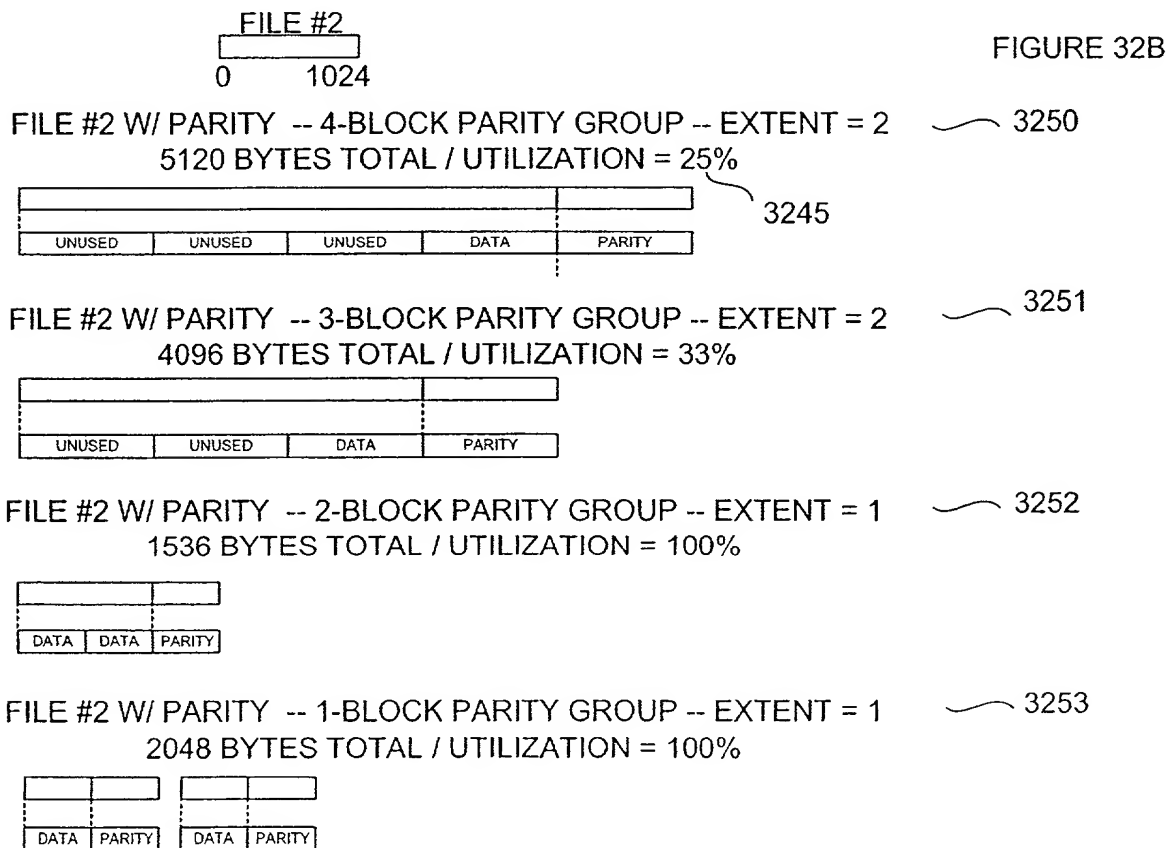
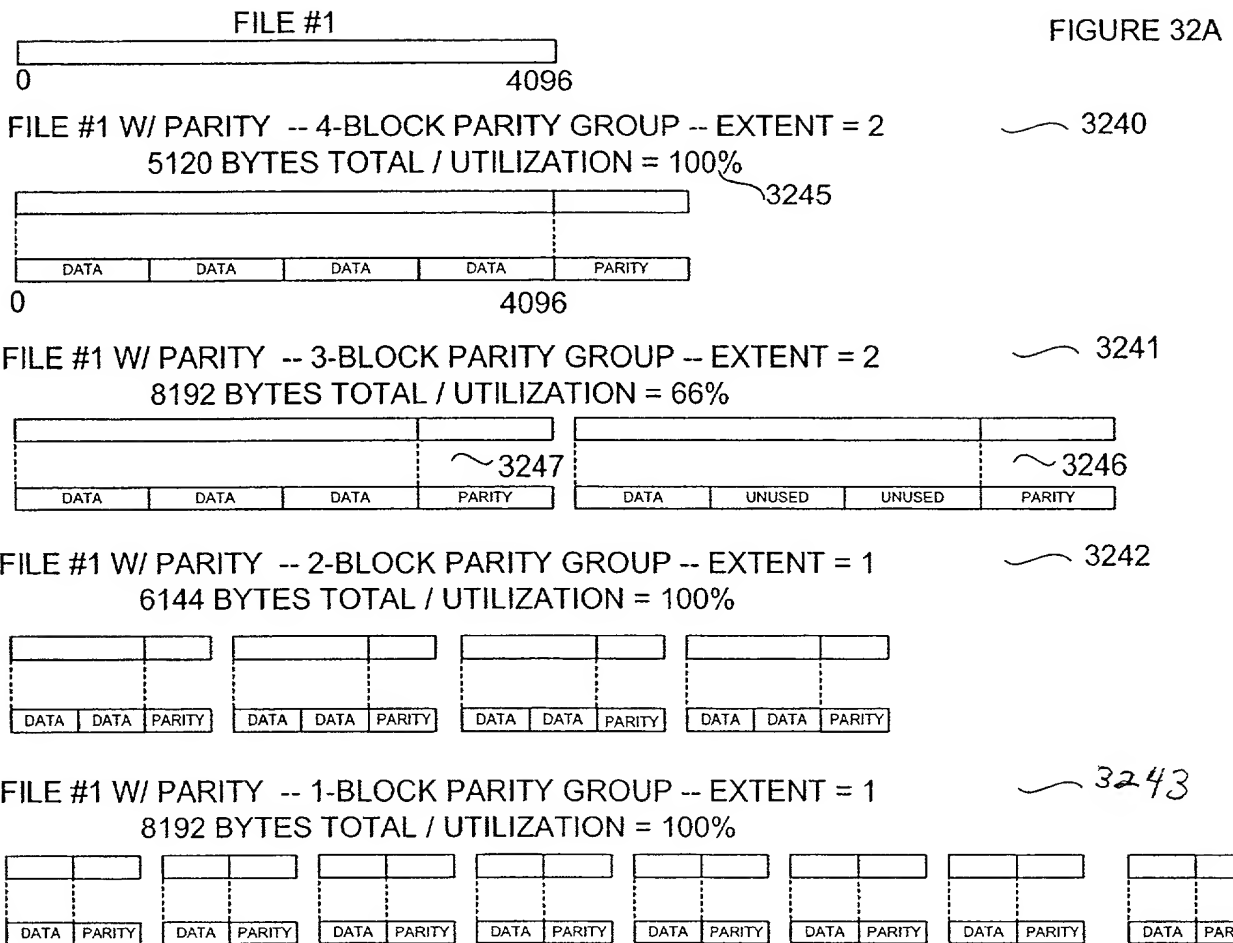


FIGURE 32A

FIGURE 32B

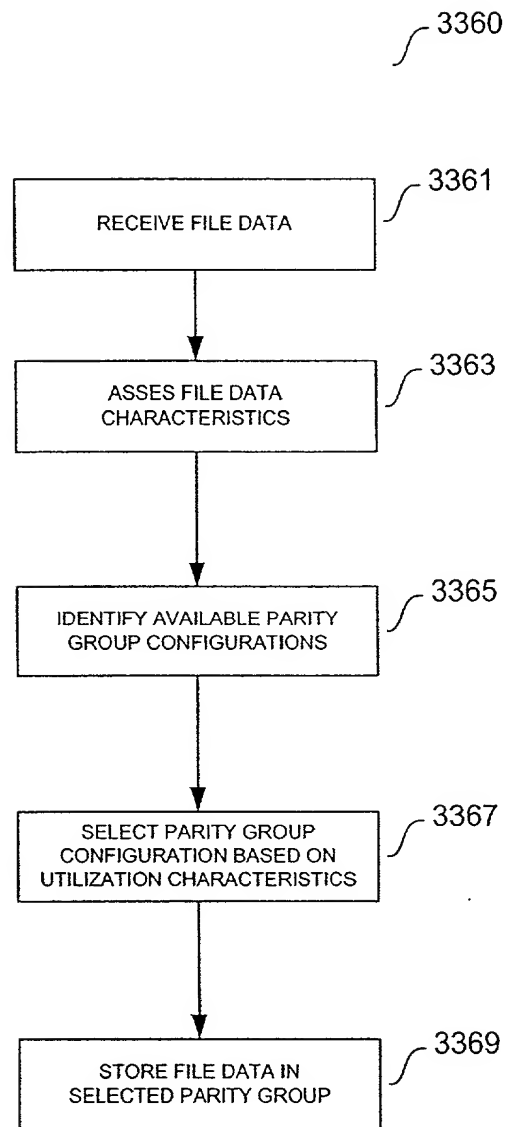


FIGURE 33

FIGURE 34A

INITIAL ALLOCATION				DISK SPACE %
<div>DATA DATA DATA DATA PARITY</div>	4 block parity	10000 groups		36%
<div>DATA DATA DATA PARITY</div>	3 block parity	10000 groups		28%
<div>DATA DATA PARITY</div>	2 block parity	10000 groups		22%
<div>DATA PARITY</div>	1 block parity	10000 groups		14%



FIGURE 34B

DISK USAGE				DISK SPACE %
FREE	OCCUPIED	TOTAL		
2500 groups	7500 groups	10000 groups		36%
7500 groups	2500 groups	10000 groups		28%
3500 groups	6500 groups	10000 groups		22%
500 groups	9500 groups	10000 groups		14%



FIGURE 34C

REDISTRIBUTION				DISK SPACE %
FREE	OCCUPIED	TOTAL		
2500 groups	7500 groups	10000 groups		36%
2500 groups	2500 groups	5000 groups		14%
3500 groups	6500 groups	10000 groups		22%
10500 groups	9500 groups	20000 groups		28%

-5000 groups of 3 block parity

+10000 groups of 1 block parity

REDISTRIBUTION

PARITY GROUP REDISTRIBUTION PROCESSES

FIGURE 35A

PARITY GROUP DISSOLUTION

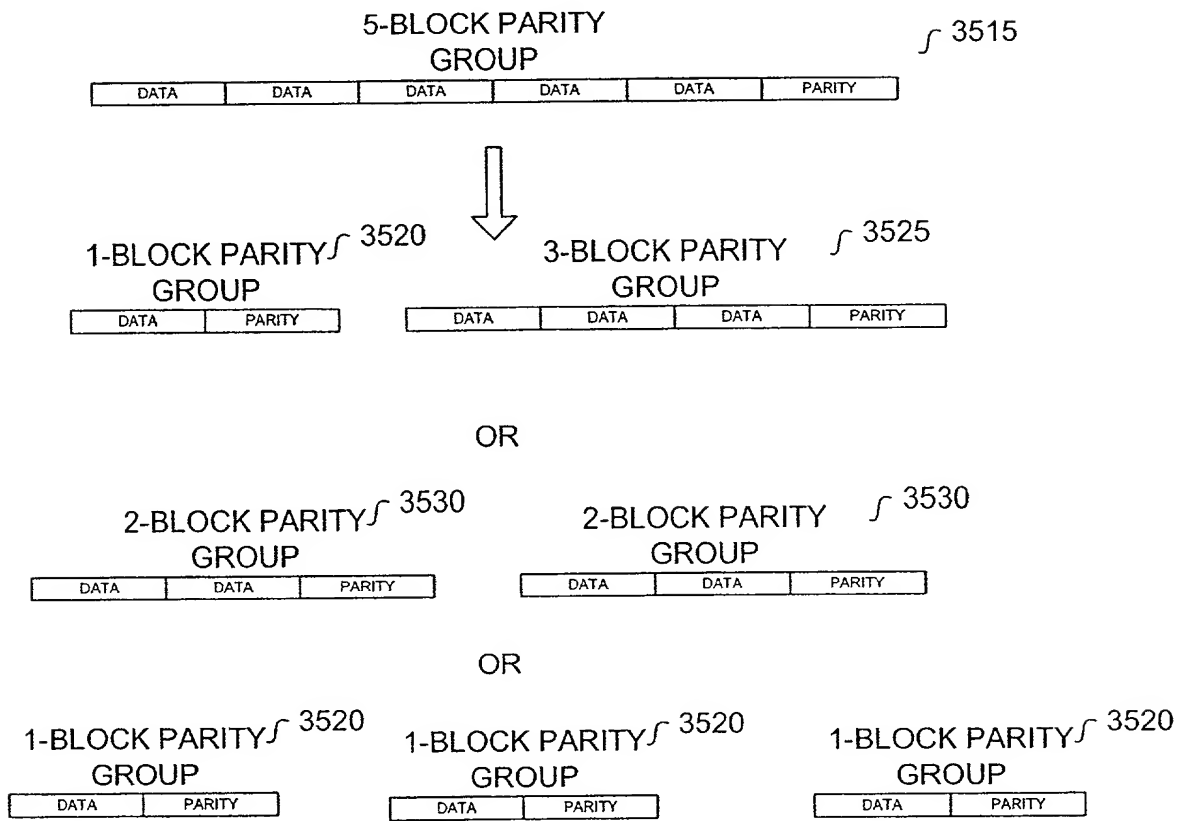
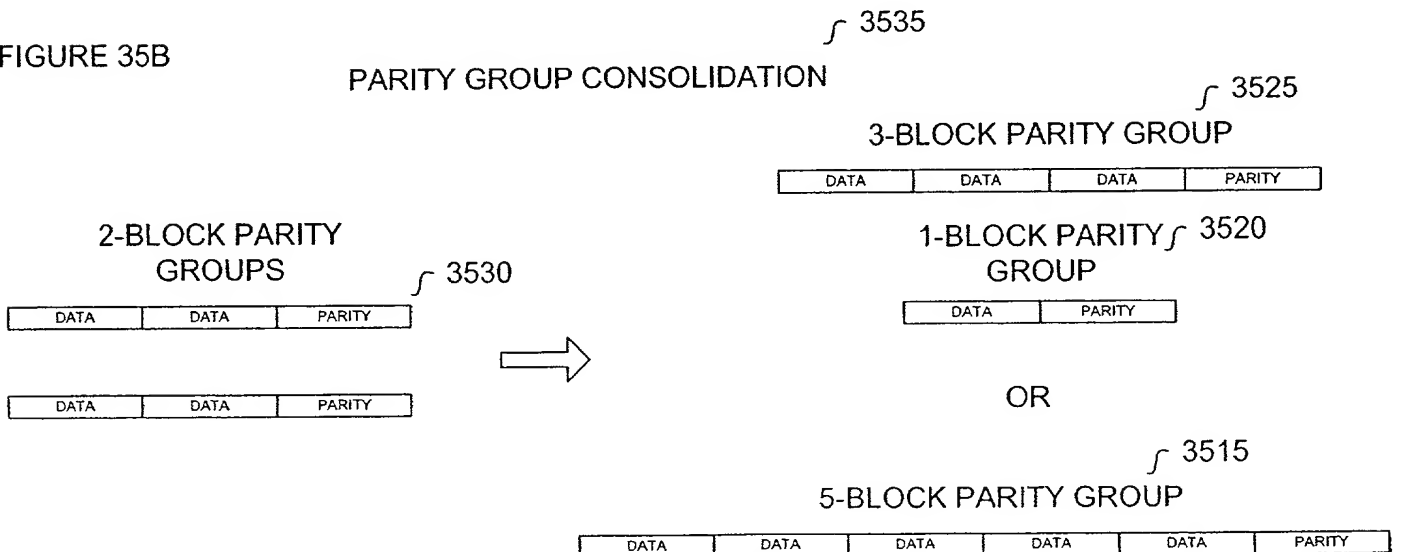


FIGURE 35B

PARITY GROUP CONSOLIDATION



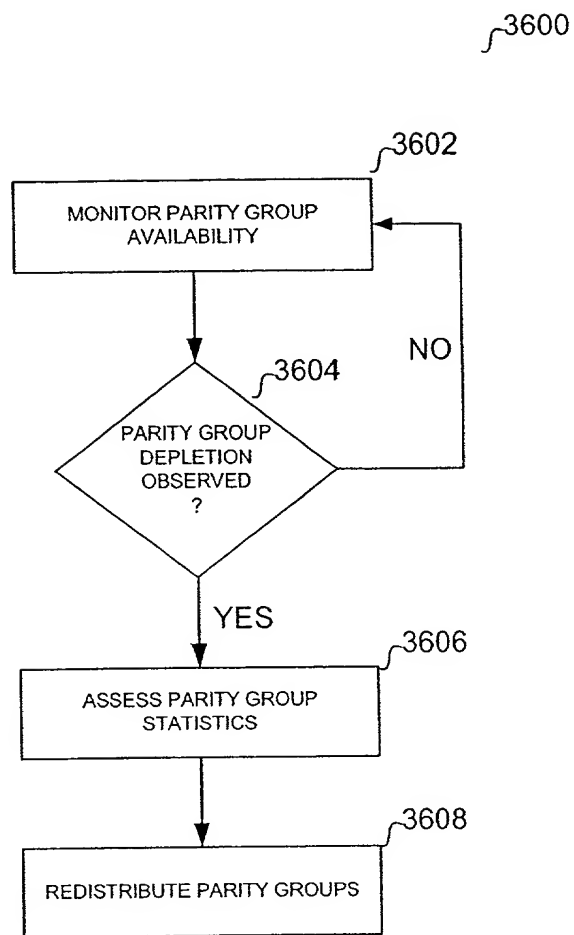


FIGURE 36

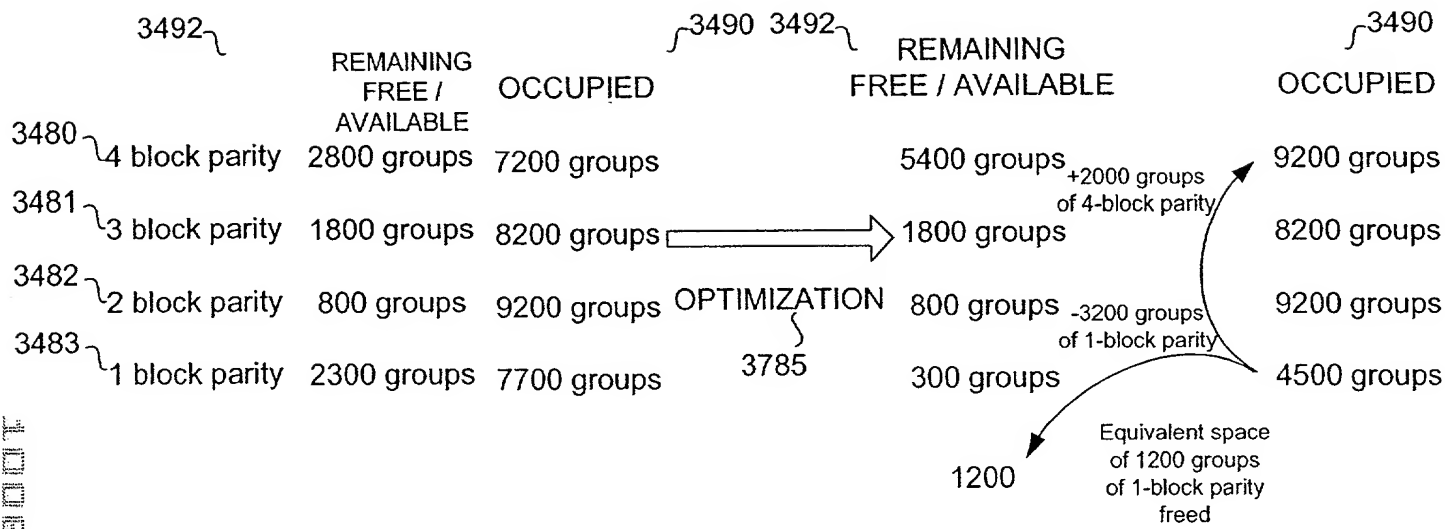


FIGURE 37

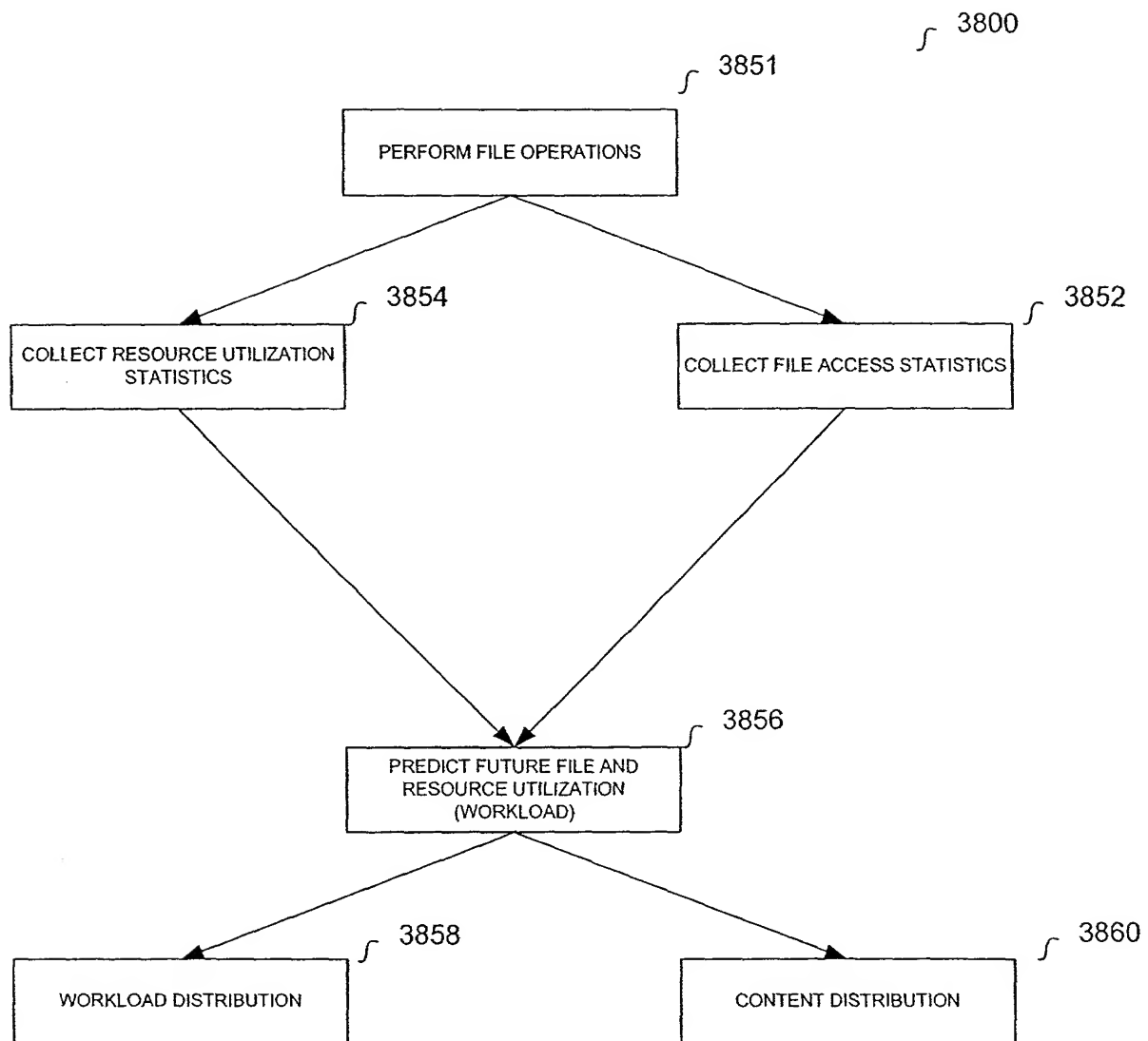


FIGURE 38

3900

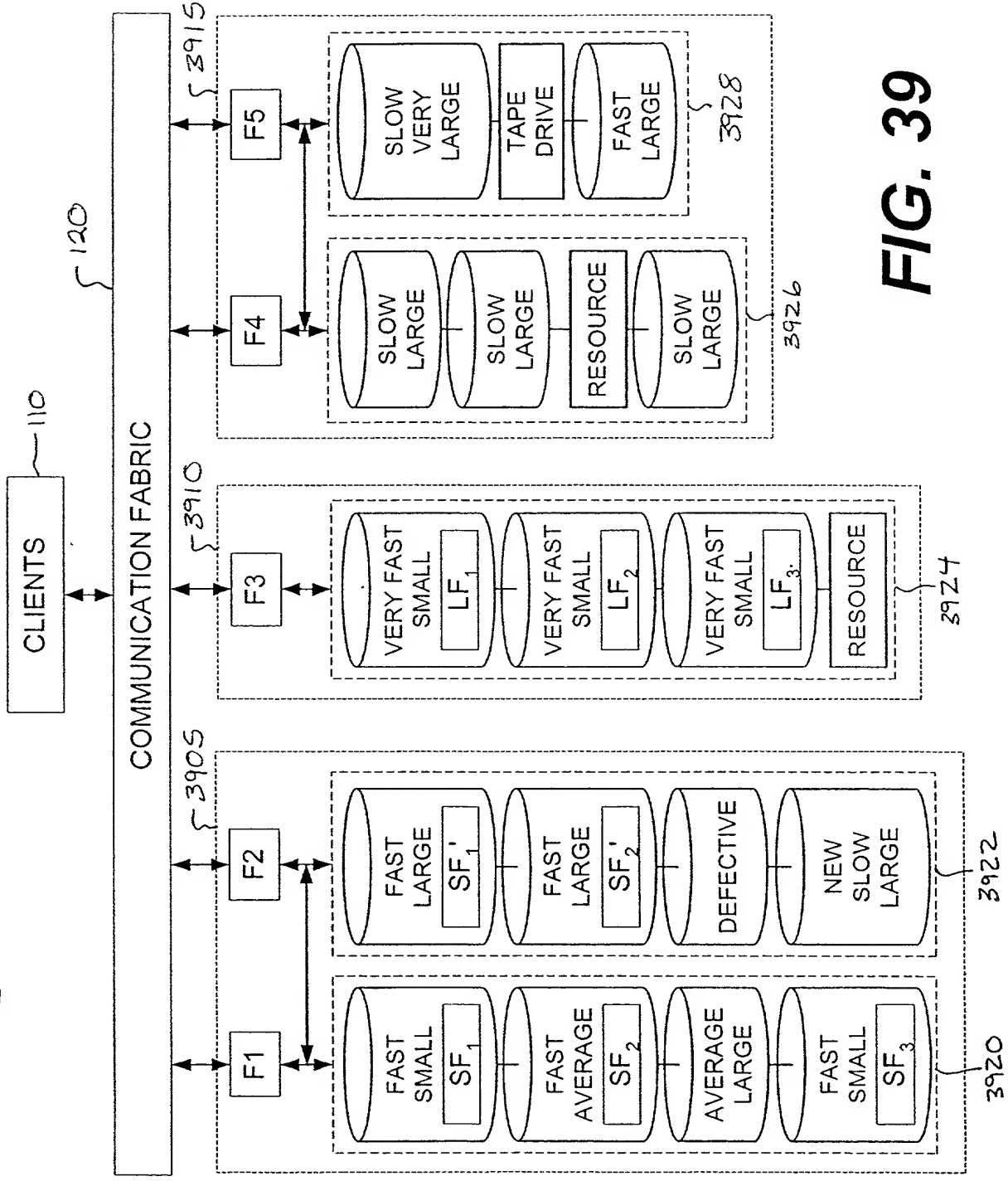


FIG. 39

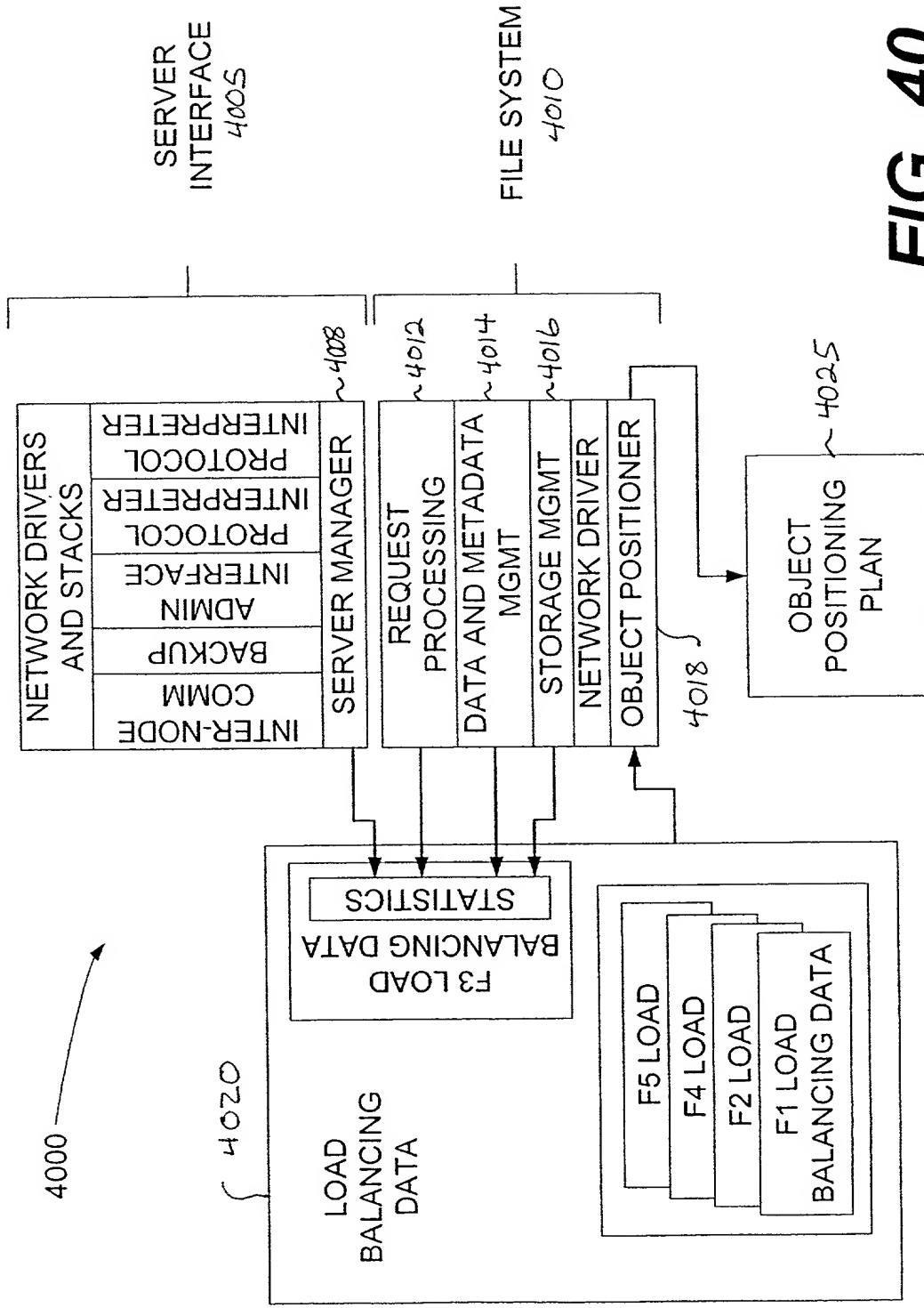


FIG. 40

F3 OBJECT POSITIONING PLAN

- Push LF to F4-F5 Cluster
- Issue File Handle For LF = Stale
- If Requested,
 - Send acceptance for copy of SF to F1
 - Create copy of SF
 - Send file handle of SF to F1

4025

FIG. 41

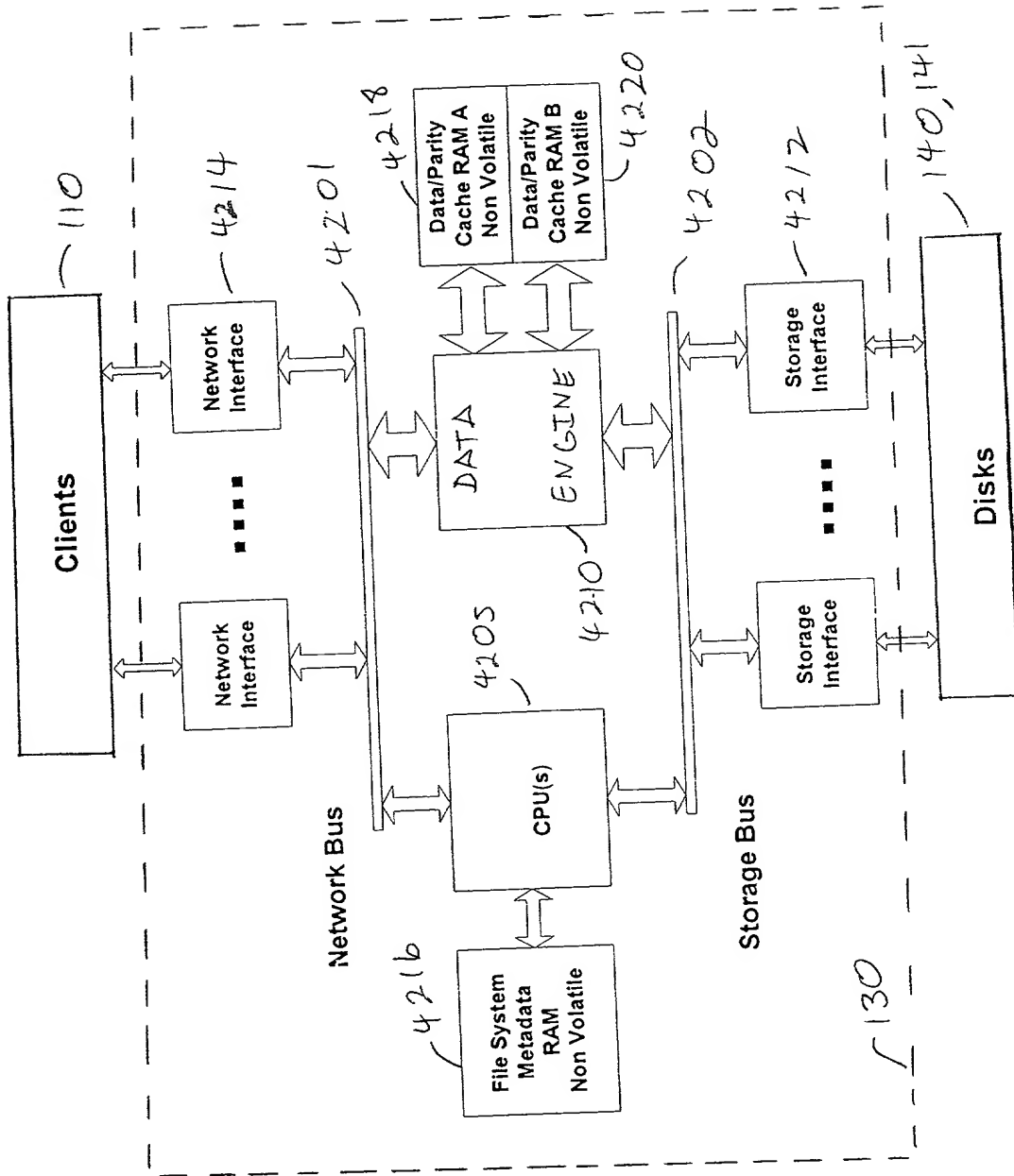


FIGURE 42

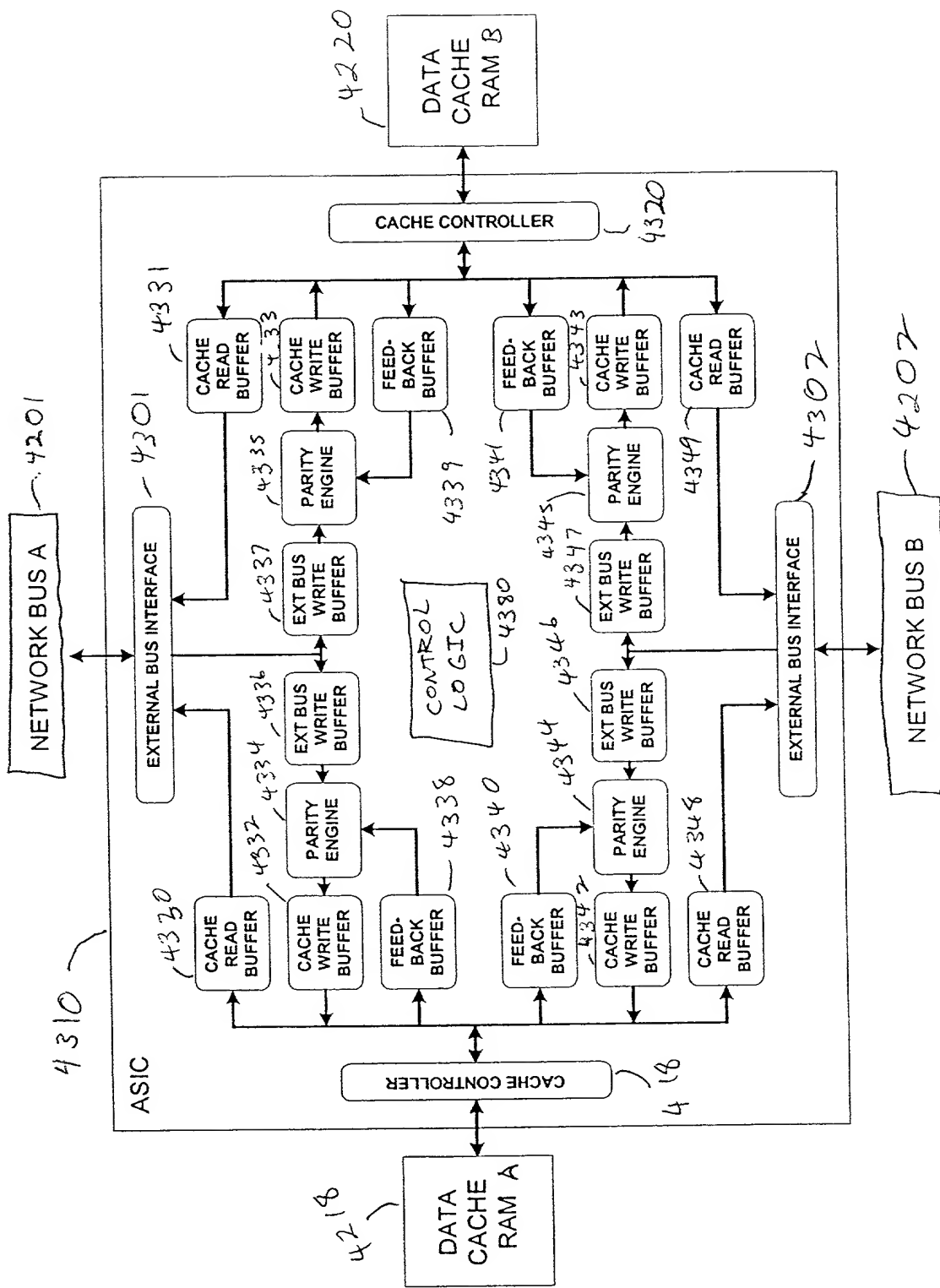


FIGURE 43

PCI map	Block Size	Opcode	Spare	Parity Index	Spare	RAM Adr
63----	62, 61----	59, 58----	56, 55----	51, 50----	35, 34, 32,	31-----0

4400

FIGURE

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